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FODDER FOR THE SILO: A FORAGE HARVESTER MOVES INTO A MAIZE CROP.

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# Brucellosis-Tested Swine Herds (As at 20th December, 1955)

## Berkshire.

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S. Cochrane, "Stanroy" Stud, Felton
G. Handley, "Handleigh" Stud, Murphy's Creek
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
M. K. Collins, "Kennington" Stud, Underwood road, Eight Mile Plains
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
H. H. Sellars, "Tabooba" Stud, Beaudesert
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H.M. State Farm, Numinbah
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M. G. and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
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G. McLennan, "Murcott" Stud, Willowvale
H. M. Wyatte, "Cumberland Vale," Cooyar
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F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
The Marsden Home for Boys, Kallangur
M. F. Callaghan, Lower Mount Walker, *via* Rosewood
J. B. Lotz, M.S. 794, Kalbar
G. J. Hutton, Woodford
E. R. Kimber, Coalstoun Lakes
K. B. Jones, "Cefn" Stud, Pilton
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
L. Pick, Mulgeldie
J. W. Bukowski, "Secreto" Stud, Oxley

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Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
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K. B. Jones, "Cefn" Stud, Pilton
R. Postle, "Yarralla" Stud, Pittsworth
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O. B. Vidler, Manneum, Kingaroy
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
S. and S. Ouglitchinin, "Pinefields," Old Gympie road, Kallangur
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
Kruger and Sons, "Greyhurst," Goombungee
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. C. and C. P. F. Hill, Kingaroy

## Tamworth.

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N. R. Potter, "Actonvale" Stud, Wellcamp
D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
A. J. Surman, "Namrus" Stud, Noble road, Goodna
Department of Agriculture and Stock, Regional Experiment Station, Kairi
E. C. Phillips, "Sunny View," M.S. 90, Kingaroy
F. N. Hales, Kerry road, Beaudesert
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
L. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
H.M. State Farm, Numinbah
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes
G. H. Sattler, Landsborough
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
Q.A.H.S. and College, Lawes
R. H. Coller, Tallegalla, *via* Rosewood
A. J. Potter, "Woodlands," Inglewood
P. V. Campbell, "Lawn Hill," Lamington
L. C. and C. P. F. Hill, Kingaroy

## Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
J. Gleeson, "Iona Vale" Stud, Kuraby
C. R. Smith, "Belton Park" Stud, Nara
H. H. Sellars, "Tabooba" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
F. K. Wright, Narangba, N. C. Line
R. A. Collings, "Rutholme" Stud, Waterford
W. R. Dean, "Trelawn," Tandur, *via* Gympie
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
Mrs. R. A. Melville, "Wattledale Stud," Beenleigh road, Sunnybank
S. and S. Ouglitchinin, "Pinefields," Old Gympie road, Kallangur
A. J. Hicks, M.S. 98, Darlington, *via* Beaudesert
Kruger and Sons, "Greyhurst," Goombungee

## British Large Black.

H. W. Naumann, "Parkdale" Stud, Kalbar

# Tuberculosis-Free Cattle Herds.

The studs listed below have fulfilled the conditions of the Department's Tuberculosis-free Herd Scheme to 29th February, 1956.

| Breed. | Owner's Name and Address. |
|---|---|
| Aberdeen Angus .. | The Scottish Australian Company Ltd., Texas Station, Texas |
| A.I.S. .. .. .. | M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy |
| | F. B. Sullivan, "Fermanagh," Pittsworth |
| | D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth |
| | W. Henschell, "Yarranvale," Yarranlea |
| | Con. O'Sullivan, "Navillus" Stud, Greenmount |
| | H. V. Littleton, "Wongalea" Stud, Hillview, Crow's Nest |
| | J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy |
| | Sullivan Bros., "Valera" Stud, Pittsworth |
| | Reushle Bros., "Reubydale" Stud, Ravensbourne |
| | H. F. Marquardt, "Chelmer" Stud, Wondai |
| | A. C. and C. R. Marquardt, "Cedar Valley," Wondai |
| | A. H. Sokoll, "Sunny Crest" Stud, Wondai |
| | W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt |
| | G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar |
| | C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman |
| | W. H. Thompson, "Alfa Vale," Nanango |
| | S. R. Moore, Sunnyside, West Wooroolin |
| | H.M. State Farm, Numinbah |
| | D. G. Neale, "Groveley," Greenmount |
| | Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy |
| | A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah |
| | W. D. Davis, "Wamba" Stud, Chinchilla |
| | Queensland Agricultural High School and College, Lawes |
| | C. K. Roche, Freestone, Warwick |
| | Mrs. K. Henry, Greenmount |
| | D. B. Green, Deloraine Stud, Durong, Proston |
| | E. Evans, Wootha, Maleny |
| | T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla |
| | J. Crookey, "Arolla A.I.S. Stud" Fairview, Allora |
| | M. F. Power, "Barfield," Kapaldo |
| | A. H. Webster, "Millievale," Derrymore |
| | W. H. Sanderson, "Sunlit Farm," Mulgildie |
| | R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes |
| Ayrshire .. .. | L. Holmes, "Benbecula," Yarranlea |
| | J. N. Scott, "Auchen Eden," Camp Mountain |
| | "St. Christopher's" and "Iona" Studs, Brookfield road, Brisbane |
| | E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny |
| | C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough |
| | G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie |
| | T. F. Dunn, Alanbank, Gleneagle |
| Friesian .. .. | C. H. Naumann, "Yarrabine" Stud, Yarraman |
| | D. J. Pender, "Camelot," Lytton road, Lindum |
| Guernsey .. .. | C. D. Holmes, "Springview," Yarraman |
| | A. B. Fletcher, Cossart Vale, Boonah |
| | W. H. Doss, Degilbo, *via* Biggenden |
| | A. C. Swendson, Coolabunia, Box 26, Kingaroy |
| | C. Scott, "Coralgrae," Din Din road, Nanango |
| | R. J. Wissemann, "Robnea," Headington Hill, Clifton |
| | G. L. Johnson, "Old Cannindah," Monto |
| | A. Ruge & Sons, Woowoonga, *via* Biggenden |
| | G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428 Grantham |
| Jersey .. .. .. | Queensland Agricultural High School and College, Lawes |
| | J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount |
| | J. F. Lau, "Rosallen" Jersey Stud, Goombungee |
| | G. Harley, Hopewell, M.S. 189, Kingaroy |
| | Toowoomba Mental Hospital, Willowburn |
| | Farm Home for Boys, Westbrook |
| | F. J. Cox and Sons, "Rosel" Stud, Crawford, Kingaroy Line |
| | R. J. Browne, Hill 60, Yangan |
| | P. J. L. Bygrave, "The Craigan Farm," Aspley |
| | R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy |
| | P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood |
| | E. A. Matthews, "Yarradale," Yarraman |
| | A. L. Semgreen, "Tecoma," Coolabunia |
| | L. E. Meier, "Ardath" Stud, Boonah |
| | A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk |
| | W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood |
| | Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango |
| | F. W. Verrall, "Coleburn," Walloon |
| | C. Beckingham, Trouts road, Everton Park |
| | W. E. O. Meier and Son, "Kingsford" Stud, Alberton, *via* Yatala |
| | G. H. Ralph, "Ryecombe," Ravensbourne |
| | Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy |
| | W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah |
| | Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman |
| | D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick |
| | J. W. Carpenter, Flagstone Creek, Helidon |
| | H. G. Johnson, "Windsor" Jersey Stud, Beaudesert |
| | W. S. Kirby, Tinana, Maryborough |
| | S. A. Cramb, "Trecarne Stud," Lockyer |
| | G. & V. Beattie, "Beauvern," Antigua, Maryborough |
| | J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla |
| | W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah |
| | T. Nock, Dallarnil |
| | P. Fowler & Sons, "Northlea," Coalstoun Lakes |
| | F. Porter, Conondale (Jersey) |
| Poll Hereford .. | W. Maller, "Boreview," Pickanjinnie |
| | J. H. Anderson, "Inverary," Yandilla |
| | D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick |
| | E. W. G. McCamley, Eulogie Park, Dululu |
| | Wilson and McDouall, Calliope Station, Calliope |

# Machine Sown Pastures on the Darling Downs.

By R. G. WILSON, Adviser in Agriculture.

(*Continued from page 70 of the February issue.*)

## MECHANICAL REGULATION OF PLANTING RATES.

The planting rates of small smooth seeds which flow readily through the drill can be reduced by obstructing the flow of seed. Leather thongs, rope, twine or strips of flannel are allowed to hang down the throat of the seed tubes and are retained in place by tacking one end to the wall of the seed box directly above the tubes. Lengths of wire in the form of an S are also used for this purpose.

Some combines are supplied with tested metal cover plates with which seeding rates can be adjusted.

Paper funnels which can be tacked to the side of the seed hopper and which hang down into the seed tubes can also be used for sowing small smooth seeds such as lucerne.

Plate 7.

**Pasture Establishment by Drill Sowing in the Chinchilla District.** With careful land preparation and good seed, pastures such as these may be successfully planted using seeding rates as low as 2 lb. Rhodes grass and ¾ lb. lucerne per acre, with a sawdust carrier.

Plate 8.

**Sward Lucerne at Chinchilla Sown at only 1 lb. per Acre.** Light sowings such as this have a better chance of surviving long dry periods. Given occasional renovation, they persist well and provide an excellent grazing supplement to native pastures.

## ADJUSTING THE SOWING RATE.

Setting the drill or combine for the required sowing rate involves simple trial sowings of the actual seed mixture being used. The mixtures are based on proportions by weight so that the actual weight of seed in any given weight of mixture can be calculated.

A small quantity of the mixture is placed in the hopper to be used, and one wheel of the machine is jacked up. With the machine in gear the wheel is rotated a few times and the seed mixture delivered through the tubes into paper bags or onto a tarpaulin spread on the ground. This is weighed and represents the amount which would be sown on an area equal to the *width of drill,* multiplied by the *circumference of the wheel,* multiplied by *the number of turns of the wheel.*

The following method provides a simple way of determining the planting rate. The number of revolutions of the drill which is equivalent to 1/10th acre is determined from the simple formula given below:—

$$\frac{9 \times 484}{\text{Drill width in feet} \times \text{wheel circumference in feet}}$$

= number of revolutions for 1/10th acre.

The seed delivered through the drill when the driving wheel is turned this number of revolutions is the amount which would be sown on 1/10th acre.

*Example*: A 24-run seed drill is, say, 14 feet in width, and the wheel circumference 13 feet. In this case the number of revolutions for 1/10th acre $= \frac{9 \times 484}{14 \times 13} = 24$ (approximately).

By turning the jacked-up driving wheel 24 times, the seed which would be planted in 1/10th acre is collected. Multiplying the weight of seed in the mixture by 10 then gives the sowing rate per acre.

The machine is then adjusted to increase or decrease the rate as desired. If no further adjustment is possible, the amount of carrier in the seed mixture can be varied so as to permit the given quantity of seed to be planted over the desired area.

Where the drill carries an acre-meter, this should be set to zero. The machine is put in gear, jacked up, and the wheel turned until the meter registers a given area—for example, ¼ acre. The seed mixture delivered during this period is weighed and the actual planting rate is determined. If this is not the rate required for the seeds being planted, the adjustments can be made as described above.

## PLANTING TABLES.

The accompanying tables, which give details of sowing rates and machine adjustments, have been prepared as the result of planting tests carried out on the Darling Downs.

These tables show that a wide variety of pasture mixtures may be planted at widely differing rates with modern seed drills.

*Information regarding the mixtures best suited to any locality or soil type should be obtained from the local agricultural officer.*

Plate 9.

**Green Panic in Rows on a Stony Slope near Pittsworth.** The soil here was too shallow for cropping, and mintweed had previously taken control. The grass was sown at the rate of 1½ lb. per acre in 28 in. drills. A few mintweed plants remain in the inter-row spaces, but the control has been remarkably good.

## PLANTING TABLE FOR MACHINE-SOWN PASTURES ON THE DARLING DOWNS.

### PART 1, USING GRAIN BOX.

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| Green panic (40% germination) | 10½ oz. | Nil | Minimum wheat with "castings" D.886 | 28 | Nov.–Feb. |
| Green panic (40% germination) | 1 lb. 5 oz. | Nil | Minimum wheat with "castings" D.886 | 14 | Nov.–Feb. |
| Green panic .. | 2 lb. | Nil<br>Very good flow<br>Lucerne may be added | 23 lb. wheat .. .. | 21 | Nov.–Feb. |
| Green panic (40% germination) | 2 lb. 10 oz. | Nil | Minimum wheat with "castings" D.886 | 7 | Nov.–Feb. |
| Green panic .. | 2 lb. | Nil | 12–17 lb. wheat | 28 | Jan.–Feb. |
| Green panic ..<br>Lucerne .. ..<br>Medics or clovers .. | 4 lb.<br>½ lb.<br>1 lb. | Nil<br>Excellent flow | 21–36 lb. wheat | 14 | Jan.–Feb.; occasionally spring |
| Green panic ..<br>Lucerne .. .. | 3 lb.<br>1 lb. | Lucerne sown through small seed box attachment<br>Green panic sown through paper funnels tacked above every fourth hopper of grain box | Green panic set for 58 lb. wheat | Sown in alternate 14 in. drills (that is, 28 in. between grass rows). | Jan.–Feb.; occasionally spring |
| Green panic ..<br>Phasey bean .. | 3 lb.<br>⅕ lb. | Nil | 18 lb. wheat | 21 | Jan.–Feb.; occasionally spring |
| Green panic ..<br>Phasey bean ..<br>Lucerne .. .. | 4 lb.<br>½ lb.<br>½ lb. | Wheat—midseason to early variety<br>Excellent pasture | 18 lb. wheat | 7 | Jan.–Feb.; occasionally spring |

| | | | | | |
|---|---|---|---|---|---|
| Green panic .. | 4 lb. | Nil | 18–26 lb. wheat | 14 | Jan.–Feb. |
| Lucerne .. .. | ½–1 lb. | Very good flow | | Grass seed and legume seed may be separated and sown in alternate 14 in. drills | |
| Black medic *or* Barrel medic | 1 lb. | | | | |
| *and/or* Phasey bean | 1/10 lb. | | | | |
| Green panic .. | 3 lb. | 7 lb. (1 : 1) mixed cypress-hardwood sawdust | 27–30 lb. oats; (if 4 lb. Rhodes is used, set for 45–50 lb. oats) | 7 | Jan.–Feb.; occasionally spring |
| Rhodes grass .. | 2 lb. | Very good flow | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |
| Green panic .... | 3 lb. | 8 lb. (1 : 1) sawdust | 50 lb. oats; needs stirring to prevent packing | 7 | Feb. |
| Rhodes grass .. | 3 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Wimmera ryegrass .. | 1 lb. | | | | |
| Green panic .. | 2 lb. | (1 : 1) mixed cypress pine and hardwood sawdust. Needs stirring occasionally and requires a man on the drill | 45–70 lb. oats | 7 | Mid Feb.–early Mar. |
| Rhodes grass .. | 3–4 lb. | | | | |
| Italian ryegrass .. | 2 lb. | | | | |
| Wimmera ryegrass .. | 1 lb. | | | | |
| H.l. ryegrass .. | 2 lb. | | | | |
| Barrel medic .. | 1 lb. | An excellent pasture | | | |
| Black medic .. | 1 lb. | | | | |
| Lucerne .. .. | ½ lb. | | | | |
| Red clover .. .. | 1 lb. | | | | |
| Blue panic .. .. | 4 lb. | Nil | 21–36 lb. wheat | 14 | Jan.–Feb.; occasionally following spring rains |
| Lucerne .. .. | ½ lb. | Excellent flow | | | |
| Medics or clovers .. | 1 lb. | | | | |
| Scrobic .. .. | 3 lb. | Nil | 18–21 lb. wheat | 42 | Jan. |
| | | Excellent flow | | | |
| Rhodes grass—seed to be sieved free of large straws | 2 lb. | 4 lb. (1 : 2) cypress pine sawdust, bone dry and sieved | 60 lb. oats; may be necessary to increase setting to 120 lb. oats if packing severe | 21 | Jan.–Feb.; occasionally after good spring rains |
| | | Good flow | | If "bridging" is severe use 7 in. spacing | |

PART 1. USING GRAIN BOX—*continued.*

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| Rhodes grass .. | 3 lb. | Sawdust (1 : 1) | 30 lb. oats | 7 | Jan.–Feb. |
| Lucerne .. .. | 2 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |
| Rhodes grass .. | 4 lb. | 16½ lb. (1 : 3) hardwood sawdust, bone dry and sieved | 88 lb. oats | 14 | Jan.–early Mar. |
| Lucerne .. .. | ½ lb. | | | | |
| Medics .. .. | 1 lb. | Satisfactory flow | | | |
| Rhodes grass .. | 4 lb. | 10 lb. (1 : 2) hardwood sawdust | 80 lb. oats | 14 | Jan.–Feb. |
| Lucerne .. .. | 1 lb. | Satisfactory flow | | | |
| Rhodes grass .. | 4 lb. | 16 lb. rice hulls | 120 lb. oats | 14 | Jan.–Feb. |
| Lucerne .. .. | ½ lb. | Good flow | | | |
| Medics .. .. | 1 lb. | | | | |
| Rhodes grass .. | 6 lb. | 22 lb. (1 : 2) cypress pine sawdust, bone dry and sieved | 60 lb. oats | 14 | Jan.–early Mar. |
| Wimmera ryegrass .. | 2 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Clovers .. .. | 2 lb. | Good flow | | | |
| Rhodes grass .. | 6 lb. | 16 lb. rice hulls | 120 lb. oats | 14 | Feb.–early Mar. |
| Wimmera ryegrass .. | 2 lb. | Good flow | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Medics or clovers .. | 2 lb. | | | | |
| Rhodes grass .. | 6 lb. | 22 lb. (1 : 2) hardwood sawdust, sieved. Strong tendency to "bridge" | 130 lb. oats | 14 | Feb.–early Mar. |
| Wimmera ryegrass .. | 2 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Clovers .. .. | 2 lb. | | | | |
| Rhodes grass .. | 3–4 lb. | Sawdust (1 : 1); (need wire to rupture blockages) | 40–45 lb. oats | 7 | Feb. |
| H.l. ryegrass .. | 3 lb. | | | | |
| Italian ryegrass .. | 3 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Red clover .. .. | 1 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Rhodes grass .. .. | 3 lb. | 8¼ lb. (1 : 2) cypress sawdust | 22–30 lb. oats | 14 | Jan.–Feb. |
| Lucerne .. .. | ½ lb. | Excellent pasture | | | |
| Barrel medic .. | ½ lb. | | | | |
| Phasey bean .. | 1/10 lb. | | | | |
| *Lucerne .. .. | 8 lb. | 16 lb. (1 : 2) hardwood sawdust Good flow | 18 lb. wheat | 7 | Mar.–May |
| *Lucerne .. .. | 1½ lb. | 16 lb. hardwood sawdust Good flow | 18 lb. wheat | 42 | Mar.–May |
| *Lucerne .. .. | 6 lb. | 20 lb. wheat (grain type) Excellent flow | 23–26 lb. wheat | 7 | Apr.–May |
| *Lucerne .. .. | 2 lb. | Mixed in bushel lots with 25 lb. wheat; 18 lb. wheat | 28 lb. wheat<br>21 lb. wheat | 7 | Mar.–May; occasionally early spring |
| *Lucerne .. .. | 3 lb. | Sawdust (1 : 1) | 17 lb. wheat | 7 | Mar.–May; occasionally early spring |
| *Lucerne .. .. | 3 lb. | 4 lb. (1 : 1¼) sawdust, slightly damp | 33 lb. wheat | 14 | Mar.–May |
| *Row lucerne .. | 1 lb. | 4 lb. (1 : 4) sawdust. Could use less sawdust. Row lucerne usually sown from small seed box attachment 1–1½ lb. per acre; 3 runs of oats then filling in between lucerne rows | 43 lb. oats | 42 (every sixth run) | Mar.–May |
| *Lucerne .. .. | 1 lb. | Sawdust (1 : 4) | 28 lb. wheat | 7 | Mar.–May; occasionally spring |
| *Barrel medic .. | 3 lb. | Mixed in bushel lots with 25 lb. wheat; 18 lb. wheat | 28 lb. wheat<br>21 lb. wheat | 7 | Feb.–Mar.; occasionally Apr.–May |

NOTE.—If the Rhodes grass mixtures pack excessively, it would be advisable in most cases to increase the coarse setting to maximum.

* These legumes should be sown through a lucerne seed box attachment if this is available, in which case no carrier is required.

PART 1. USING GRAIN BOX—*continued.*

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| *Barrel medic .. | 3 lb. | Sawdust (1 : 1) | 17 lb. wheat | 7 | Late Feb.–Mar. |
| Phalaris tuberosa .. | 2½ lb. | 15 lb. cypress pine sawdust | 32 lb. wheat | 7 | Mar. |
| Lucerne .. .. | 3 lb. | Good flow | | | |
| Clovers .. .. | 1–2 lb. | | | | |
| Phalaris tuberosa .. | 2½ lb. | 15 lb. (1 : 2) hardwood | 25 lb. wheat | 7 | Mar. |
| Lucerne .. .. | 3 lb. | sawdust | | | |
| Clovers .. .. | 1–2 lb. | Satisfactory flow | | | |
| Lucerne .. .. | 4 lb. | 16 lb. rice hulls (could use | 120 lb. oats | 7 | Mar.–Apr. |
| Red clover .. .. | 1½ lb. | 8 lb. and adjust gears) | | | |
| Subterranean clover | 1 lb. | | | | |
| Wimmera ryegrass .. | 2 lb. | | | | |
| Italian ryegrass .. | 4 lb. | | | | |
| Rhodes grass (may be added) | 1–2 lb. | | | | |

NOTE.—If the Rhodes grass mixtures pack excessively, it would be advisable in most cases to increase the coarse setting to maximum.
* These legumes should be sown through a lucerne seed box attachment if this is available, in which case no carrier is required.

PART 2.—USING FERTILIZER BOX.

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| Rhodes grass .. | 5 lb. | 73 lb. superphosphate | 90 lb. superphosphate | 7 | Early Mar. |
| Italian ryegrass .. | 8 lb. | | fertilizer box setting | | |
| Sub-clover .. .. | 2 lb. | | | | |
| Berseem clover .. | 2 lb. | | | | |
| Rhodes grass .. | 6 lb. | 73 lb. superhosphate | 90 lb. fertilizer box setting | 7 | Early Mar. |
| Prairie grass.. .. | 8 lb. | | | | |
| Berseem clover .. | 2 lb. | | | | |
| Sub-clover .. .. | 2 lb. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Rhodes grass .. | 3 lb. | 13 lb. (1 : 2) sawdust | 146 lb. fertilizer box setting | 7 | Feb. |
| Green panic .. | 2 lb. | | | | |
| Lucerne .. .. | ½ lb. | | | | |
| Phasey bean .. | 1/10 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |
| Green panic .. | 3 lb. | Sawdust used (1 : 1) | 150 lb. fertilizer box setting | 7 | Jan.–Feb. |
| Western Australian buffel grass | 2 lb. | | | | |
| Rhodes grass .. | 2 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Phasey bean .. | ¼ lb. | | | | |
| Rhodes grass .. | 2 lb. | Sown alone | 248 lb. fertilizer box setting | 7 | Jan.–Feb.; occasionally spring |
| Queensland buffel grass | 2 lb. | (1 : 9) damp sawdust | 290 lb. fertilizer box setting | 7 | Oct.–Feb. |
| Western Australian buffel grass | 2 lb. | (1 : 4) damp sawdust | 62 lb. fertilizer box setting | 7 | Oct.–Feb. |
| Western Australian buffel grass | 3 lb. | (1 : 4) damp sawdust | 92 lb. fertilizer box setting | 7 | Oct.–Feb. |
| Western Australian buffel grass | 3–4 lb. | (1 : 4) damp sawdust | 122 lb. fertilizer box setting | 7 | Jan.–Feb. |
| Lucerne .. .. | 1½ lb. | | | | |
| Barrel medic .. | ½ lb. | | | | |
| Queensland buffel grass | 3 lb. | (1 : 9) damp sawdust | 300 lb. fertilizer box setting | 7 | Jan.–Feb. |
| Lucerne .. .. | 1½ lb. | | | | |
| Barrel medic .. | ½ lb. | | | | |
| Green panic .. | 4 lb. | (1 : 1) slightly damp sawdust | 65 lb. fertilizer box setting | 7 | Feb. |
| Prairie grass.. .. | 6 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |
| Black medic .. | 1 lb. | | | | |

PART 2. USING FERTILIZER BOX—*continued.*

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| Rhodes grass .. | 3 lb. | (1 : 1) slightly damp sawdust | 78 lb. fertilizer box setting | 7 | Feb. |
| Prairie grass .. | 6 lb. | | | | |
| Green panic .. | 3 lb. | | | | |
| Lucerne .. .. | 1 lb. | | | | |
| Barrel medic .. | 1 lb. | | | | |
| Phalaris .. .. | 4 lb. | 83 lb. superphosphate | 90 lb. fertilizer box setting | 7 | Mar. |
| Berseem clover .. | 2 lb. | | | | |
| Sub-clover .. .. | 1 lb. | | | | |

PART 3.—USING LUCERNE SEED BOX ATTACHMENT.

These attachments are supplied by most combine or seed drill manufacturers, and should it be desired to lay down pastures with these, special charts supplied by the manufacturer may be consulted. Such small seeds as green panic and blue panic are also sown very satisfactorily through the small seed boxes.

| Pasture. | Rate Per Acre. | Carrier Used Per Acre. | Drill Setting (approx.). | Drill Spacing (inches). | When to Sow. |
|---|---|---|---|---|---|
| Green panic .. | 4 lb. | Nil | 6 lb. lucerne | 7 | Jan.–Feb. |
| Lucerne .. .. | 1 lb. | | | | |
| Phasey bean .. | ¼ lb. | | | | |

Plate 10.

**Another View of the Row Pasture Shown in Plate 9.** This 5-year-old pasture is here shown during a drought period. The rows were planted to follow the approximate contours of this sloping field.

## ROW-PLANTED GREEN PANIC SHOWS PROMISE.

Row-planted green panic pasture offers considerable promise as a source of green forage during Queensland's dry spring months. Results obtained at the Biloela Regional Experiment Station indicate that farmers in under-30-inch rainfall districts should include this type of pasture in their farm programme.

Commenting recently on the findings at the Biloela Station, the Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) said that the sward type of green panic pasture had outyielded row pastures of this species under very favourable conditions, but under dry conditions, particularly in spring and early summer, the grass in cultivated rows spaced 3 ft. 6 in. apart has produced more green feed per acre.

Investigations conducted by the Department have indicated the desirability, where butter factories are to be supplied, of having dairy herds which calve mostly in spring. At this period under dry conditions the provision of green pastures has been difficult.

Row-cultivated green panic at Biloela outyielded the sward of this species in October, November and December last year, with an improvement of up to nearly half a ton per acre of green material in the last month. The results point the way to obtaining better pasturage during dry conditions.

# Soil Conservation in the Granite Belt (Queensland).

By W. J. ROCHE, Adviser, Soil Conservation.

(*Continued from page 80 of the February issue.*)

## CONSTRUCTION OF CONTOUR BANKS.

The granite soils are particularly easy to move, and bank building can be carried out rapidly and efficiently with most farm ploughs; however, discs give a better soil movement than mouldboards. If a small grader is available it can be used successfully.

### Broad-based Contour Banks.

When using a plough, the "island" method of bank construction (Plate 12) is quite efficient; this may be summarised as follows.

An island of unploughed soil 4-6 ft. wide is left between the first furrow, which is opened on the surveyed line, and the return furrow, which is opened below the island. The top side is then ploughed to a width of 8 ft. and the lower side to 12 ft.

When the 8 ft. strip is ploughed on the top side a return is made to the upper edge of the island and the ploughed section is thrown onto the island with the result that there is a progressive accumulation of soil on the island. Because of the difference in working widths the top side of the bank is worked three times to every two on the lower side.

When the 12 ft. width has been ploughed on the bottom side a return is made to the lower side of the island. The procedure for the bottom side is similar to that of the top with this difference—the top-side soil is moved down each time onto the island, while on the lower side the tendency is to build the soil up in its original position. This construction method provides the bank with a water channel of good capacity.

### Narrow-based Banks.

The narrow-based bank is constructed entirely from the top side, and the technique varies considerably with the topography and the type of tractor and implement used.

The construction consists essentially of ploughing approximately a 6-8 ft. strip, then building onto the ploughed strip, *always throwing the soil downhill*, to form the bank. Important points to observe are:—

(1) Do not throw the soil below the original bottom furrow.

(2) Vary the position of the finish-out furrow to avoid a steep drop into the channel area.

## VINEYARD LAYOUTS.

### Slopes Less Than 6 Per Cent.

In vineyards, the narrower spacing of rows (10 ft.) necessarily means some difference in layout from that adopted for orchards with tree rows commonly located 20 ft. apart.

If the area will permit, it is desirable on slopes not exceeding 6 per cent. to use medium banks (about 10 ft. wide) and to leave out one trellis where each bank occurs (see Table 3). It is not considered advisable to locate a trellis on the crest or side of a bank as difficulties in cultivation and bank maintenance arise.

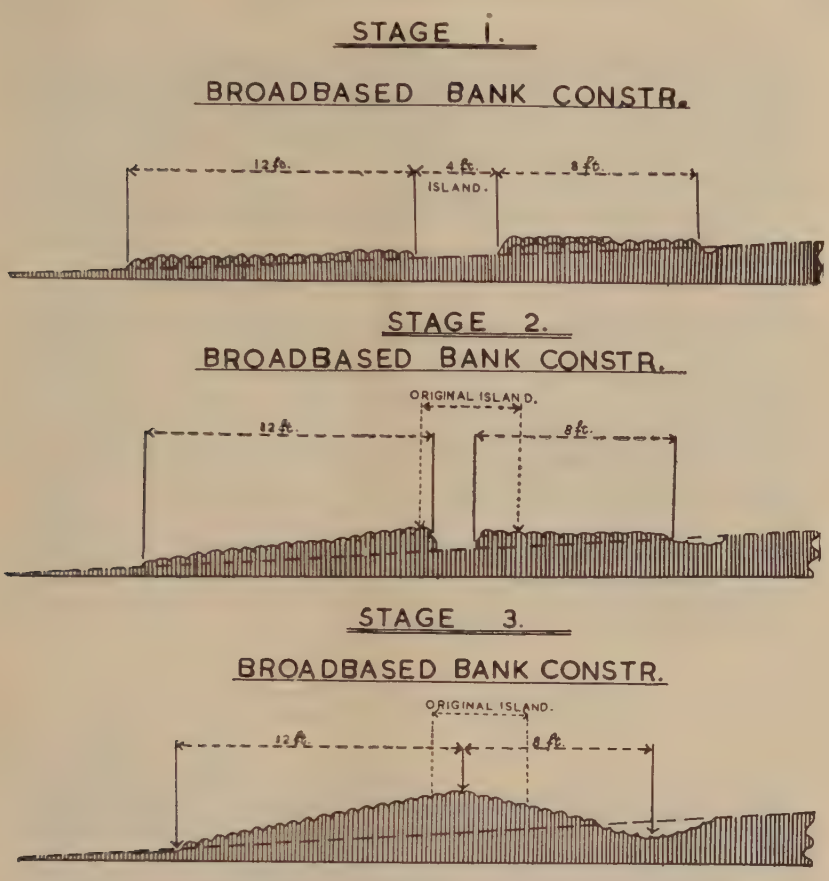


Plate 12.

**Construction of Broad-based Banks by Ploughing.** Stage 1 illustrates the commencement of the work, with the lower section ploughed once; first ploughing of the upper section has been completed, together with half of the second ploughing of this section. Stage 2 shows the movement of the soil on to the "island" strip. Note the relative movement of soil on to the island from the top and bottom sides. Stage 3 shows the completed bank in relation to the original island. A cross-section of this shape should be aimed at in building these banks.

TABLE 3.

VINEYARD CONTOUR BANKS FOR SLOPES 2–6 PER CENT.

| Slope. | Bank Spacing. | Width of Base. |
|---|---|---|
| Per cent. | Ft. | Ft. |
| 2 | 120 | 10 |
| 3 | 100 | 10 |
| 4 | 80 | 10 |
| 5 | 70 | 10 |
| 6 | 60 | 10 |

If the loss of land involved in the above method renders it impractical, the alternative is to use the method given below for slopes of 7-10 per cent.

### Slopes Exceeding 6 Per Cent.

For slopes of 7-10 per cent. the contour structure is located between two trellises and consists of a broad channel (see Table 4) with the bank as abrupt as possible (approximately 18 in. high). The channel may be cultivated for weed control, but the lower face of the bank and the narrow margin between the bank and trellis are not to be cultivated (Plate 13).

TABLE 4.

VINEYARD CONTOUR BANKS FOR SLOPES 7-10 PER CENT.

| Slope. | Bank Spacing. |
|---|---|
| Per cent. | Ft. |
| 7 | 60 |
| 8 | 50 |
| 9 | 40 |
| 10 | 30 |

Where vineyard soils are sufficiently deep, slopes in excess of 10 per cent. should be protected by contour bench-terraces in preference to banks (Plates 14-17).

Each terrace slopes backward into the initial slope and is constructed to a flat section of 10 ft. The slope to the back of the terrace should be 9-12 in., and the gradient along the terrace .15-.2 per cent. towards the outlet. In actual fact, little runoff results with the bench terraces, as a concentration of water does not normally occur.

It is advisable to keep the water flow on a terraced area to less than 600 ft. When a trellis longer than 600 ft. is planned, the water should be carried both ways, with an access track located midway. This enables the safe length to be extended to 1,200 ft. if necessary.

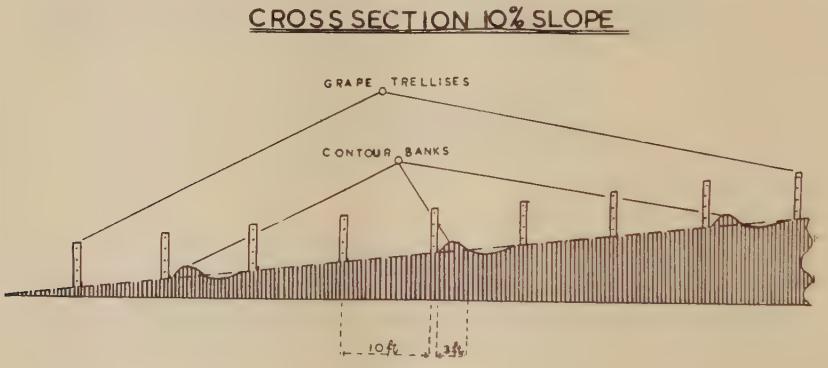


Plate 13.

**Vineyard Layout for a 10 per cent. Slope.** This section illustrates the use of narrow-based contour banks and the positions of the trellises in relation to them.

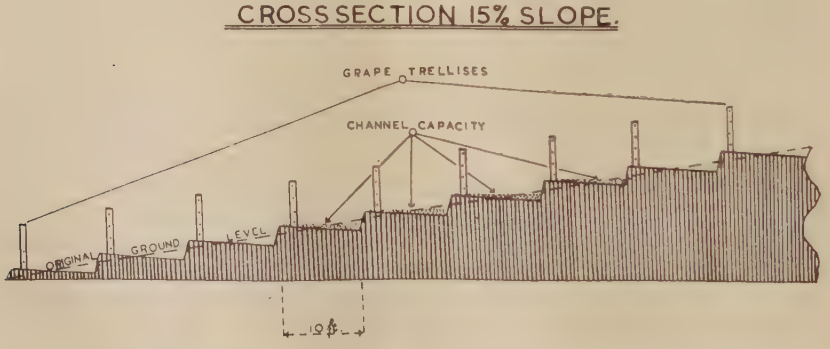


Plate 14.

**Vineyard Layout for a 15 per cent. Slope.** This section illustrates the shape of the bench terraces and the position of the trellises in relation to them.

Plate 15.

**General View of a Terraced Vineyard in the Granite Belt.** This layout is based upon bench terraces as shown in Plate 14.

Plate 16.

**Vines on Contour Terraces.** The trellises are located just far enough in from the bench edge to ensure firmness and permanency.

Plate 17.

**Forming Contour Bench Terraces for Grapes in the Stanthorpe District.** These terraces have just been constructed using a disc plough. Note the holes for trellis posts and pegs for indicating location of vines.

On these steep slopes it is advisable to survey a terrace line every 20 ft.—that is, commencing the terrace survey 20 ft. horizontally from the terrace above, on what is considered the average slope of the area being treated. The intermediate terrace is then located midway between these lines.

The terrace may be constructed with a disc or mouldboard plough or a grader. The method of construction consists of building up the lower side of the 10 ft. strip with soil ploughed and graded down from the upper half of the same strip. This leaves a rise at the top edge of the terrace which forms portion of the step-up to the next terrace.

## SUBSURFACE DRAINAGE.

It is not intended to discuss methods of subsurface drainage but merely to relate this job to the soil conservation programme.

The common type of subsurface drain used is the tile or clay pipe drain. These pipes are laid through the area to be drained, usually on the clay subsoil below cultivation depth.

Subsurface drainage plans (if necessary) should be prepared in conjunction with the soil conservation layout; this applies particularly to the outlets of the subsurface drains.

Obvious difficulties in a blending of the two drainage plans will be met and will have to be dealt with as the individual case warrants. However, it is important to remember that it is easier to lay down the subsurface drainage scheme before contour banking is commenced. In planning the combined layout, the location of drains under intended row sites should be avoided, as it could lead to rapid clogging of the pipes by the tree roots.

Plate 18.

**Contour Excavation for a Pipe Drain.** These drains are being laid to conform with the contour layout to be used when planting the area.

## PACKING AND GRADING FARM PRODUCE.

Fruit and vegetables are sometimes rejected at the Brisbane markets because the packers are obviously not thoroughly conversant with the grade standards for the various products.

Stating this recently, the Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) said that references to incorrect packing for market are contained in reports by market inspectors in the Department. The greatest fault is lack of knowledge of the correct methods of harvesting, grading, packing or bagging.

Growers generally are aware of the wealth of Departmental advisory literature that is available on the wide range of cultural and pest and disease control problems in relation to fruit, vegetables and other crops. However, many apparently do not know that there is also an equally useful range of publications on harvesting, packing and grade standards.

Appropriate information covering the presentation of all types of agricultural and horticultural produce for market can be obtained free of charge from local officers of the Department of Agriculture and Stock.

# Varietal Trends in Bananas.

By J. McGREGOR WILLS, Senior Adviser in Horticulture.

Although several varieties of banana have been introduced to Queensland, only three are grown commercially. These are Cavendish, Mons Mari and Lady Finger. Types such as Sugar and Ducasses are planted only on a limited scale.

Grower interest in these and other varieties has altered considerably in recent years. Ten years ago, the preference was for Cavendish, Mons Mari and Lady Finger in that order. Statistics compiled for the 1954-55 season (Table 1) show that Mons Mari is now as popular as the Cavendish, while Lady Finger represents about 24 per cent. of the total area under crop.

The order of preference, however, is not consistent in all districts. In the Caboolture, Tallebudgera and Beenleigh-Coomera areas, the Cavendish still holds pride of place; the Mons Mari predominates in Gympie, Cooroy, North Nambour, Brisbane, Southport and Currumbin; and the Lady Finger is the most important variety in South Nambour, Palmwoods and Redlands.

TABLE 1.

ACRES UNDER BANANAS (1954-55).

| | |
|---|---|
| Cavendish .. .. .. | 5,857 |
| Mons Mari .. .. .. | 5,884 |
| Lady Finger .. .. | 3,942 |
| Miscellaneous .. .. | 216 |

Grower preference for a particular variety may be influenced by several factors, chief among which are (*a*) its nutritional requirements, (*b*) its tolerance to local climatic conditions, (*c*) the availability of good planting material, (*d*) the market demand for the fruit, (*e*) susceptibility to disease, and (*f*) overall production per acre.

## CAVENDISH.

The Cavendish banana (Plate 1) was the first commercial variety grown in Queensland, and its popularity remained unchallenged for many years. The plant has a dwarf habit of growth which makes it very suitable for exposed situations which are affected by strong winds. However, some growers maintain that the fruit does not carry well over long distances and that losses occur in consignments to southern States during the summer months. Such losses are most marked in fruit from plantations on virgin land where the soil type is a red-brown clay loam.

Where the control of leaf spot is important, the Cavendish is often preferred to other varieties because fungicidal sprays can be more easily applied and are consequently more efficient and usually less costly. This point is rather less important than it used to be owing to the advent of improved spraying plants which do a reasonably good job in controlling the disease in tall-growing varieties.

## MONS MARI.

The Mons Mari (Plate 2) a sport from Cavendish, was first discovered at Buderim, near Nambour, Queensland, about the year 1908. It gained immediate popularity with growers and is now a recognised variety in Queensland. The Williams Hybrid, which is also a mutant or sport from the Cavendish, was established in New South Wales about the year 1926; it is almost identical with Mons Mari in appearance and the two types cannot be separated in a mixed plantation.

Plate 1.

**Cavendish Banana, North Coast.** A dwarf variety which is gradually being superseded in many areas by the Mons Mari.

Plants of the Mons Mari bear large bunches of high quality fruit that carries well over long distances. Fruit flavour and texture are comparable with the Cavendish but the wide spacing of the hands on the bunch tends to reduce the severity of damage by rust thrips, a pest which produces an unsightly blemish on the skin of the fruit. Furthermore, the fruit is fairly uniform right through the bunch, so fingers in the lower hands grade almost as well as those in the upper hands.

The nutritional requirements of the Mons Mari are less exacting than those of the dwarf Cavendish and the former variety is therefore more suitable for planting on old replant land. Another

important characteristic of the Mons Mari is its ability to produce commercially profitable fruit at high altitudes where the Cavendish does not normally thrive.

Many Queensland growers are interested in Williams Hybrid planting material from Coffs Harbour in New South Wales mainly because neither bunchy top (a virus disease) nor weevil borer occur in that district and consequently there is no risk of introducing either to the new plantation.

Plate 2.

**The Mons Mari Banana.** A semi-dwarf variety with Cavendish-type fruit. It does extremely well on replant land.

Plate 3.

**The Lady Finger Banana.** A tall variety with distinctive, first quality fruit. It is very popular at Redlands and at Buderim Mountain.

## LADY FINGER.

The Lady Finger banana (Plate 3) was brought to Queensland before the turn of the last century, probably from the Pacific Islands, but the precise date of its arrival is uncertain.

The variety is becoming increasingly popular because of its excellent performance in exposed plantations, vigorous growth on replant land and the excellent flavour of the fruit. It has a very vigorous root system and

a strong pseudostem which, despite its relatively great height, enable the plant to survive the impact of strong winds.

The main disadvantages of the variety is its susceptibility to Panama disease, which is caused by the fungus *Fusarium cubense*. Once this organism becomes established in the soil, there is always a considerable risk of losses in subsequent plantings. If Panama disease can be kept in check, the acreage under Lady Fingers may continue to increase as the amount of fertile land suitable for planting other varieties becomes less; most of the areas under crop at the moment are on land which has been cultivated for very many years.

The fruit is marketed locally in the bunch but consignments to southern markets should be packed in hands rather than in the single-fruit pack which is commonly used for Cavendish and Mons Mari.

## OTHER VARIETIES.

The Gros Michel banana was popular in the early days of banana growing in Queensland. The fruit carries well over long distances but the plants suffer severely from high winds. The variety is also very susceptible—more so than the Lady Finger—to Panama disease. But for these drawbacks there seems little doubt that the Gros Michel would still be grown in sheltered areas along the coast.

The Sugar banana will always be popular with consumers on account of the excellent flavour of the fruit. However, like the Gros Michel, the variety is extremely susceptible to Panama disease and plantings are therefore relatively small—so much so that it can scarcely be classed as a commercial type.

Ducasses is a tall-growing variety with considerable resistance to the disease known as leaf spot. It is therefore sometimes planted as a windbreak round plantations of the Cavendish banana. The bunch resembles that of the Lady Finger in appearance, but, unlike that variety, the fruit is extremely poor in quality and has little or no market value.

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# Blossom End Rot in Tomatoes.

By K. KING, Senior Adviser in Horticulture.

Nearly every season, substantial losses occur in the tomato crop from the disorder known as blossom end rot (Plate 1). This disorder is associated with unfavourable growing conditions when the fruit is maturing and is most pronounced in periods of hot dry weather during spring and early summer.

The first visible symptom of blossom end rot is a water-soaked area at the bottom or blossom end of the fruit. Later, this area turns brown and develops into a somewhat sunken circular spot which varies in size from about ¼ in. to 1½ in. in diameter, and always makes the fruit of no commercial value. Apart from the typical blemishes on the fruit, the affected plants usually look more or less normal.

## CAUSES.

The primary cause of blossom end rot is uncertain, but outbreaks are invariably associated with an upset in the water relationships of the plant—usually a water deficiency. When high temperatures are accompanied by strong dry winds, the loss of moisture by transpiration is greatly accelerated and the intake of water from the soil through the roots may not be sufficient to replace that lost through the leaves. The internal water balance of the plant then becomes abnormal. When this occurs, the fruit reacts severely and blossom end rot develops.

The disorder is usually most prevalent during periods of low rainfall, particularly in areas where water for irrigation is limited in amount or unavailable. It can, however, also

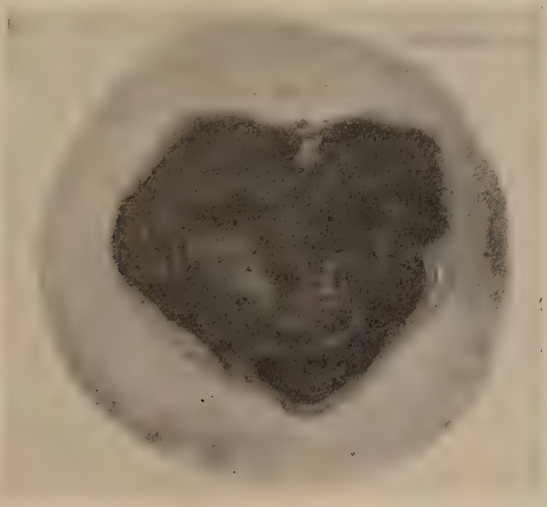

Plate 1.

**Blossom End Rot, a Physiological Breakdown in the Tomato Fruit.**

Plate 2.

**Irrigating Trellised Tomatoes.** Lack of soil moisture accentuates blossom end rot in a dry spring.

develop after an excessively wet period in which waterlogging of the soil has occurred and the root system of the plant is not functioning properly. Under such circumstances, the roots are unable to supply water to the aboveground parts of the plant fast enough for normal growth even though ample moisture is present in the soil itself.

## IRRIGATION.

As blossom end rot is frequently induced by hot dry winds, losses can to some extent be reduced by efficient irrigation practices.

Where ample water is available for irrigation, an even supply of soil moisture should be maintained throughout the growing period. The soil must never be allowed to dry out (Plate 2). Frequent light waterings are generally undesirable, for they tend to encourage root development close to the surface of the soil and the plants react quickly to stress conditions. The soil should be wetted preferably to a depth of from 2½-3 ft. in order to promote deep rooting. In a deep well-drained soil, the roots of the tomato plant will penetrate to a depth of 6 ft. provided moisture is available. Plants with an extensive root system have a large volume of soil from which they can obtain water and there is little likelihood of big gaps between the amount taken up through the roots and that lost by transpiration through the leaves.

In a well-drained soil, an inch of rain or its equivalent in the form of irrigation (approximately 22,000 gallons per acre) per week is sufficient to provide an even supply of moisture to a tomato crop carrying fruit. During very dry periods when blossom end rot is likely to develop, an additional irrigation will materially help to reduce the incidence of the disorder.

## CONSERVING SOIL MOISTURE.

When tomatoes are grown in non-irrigated areas or in areas where water supplies for irrigation are limited, control of blossom end rot becomes increasingly difficult and conservation of soil moisture is of paramount importance.

Moisture may be lost from the soil by drainage through the soil, by evaporation from the surface of the soil and by transpiration in the growing plants themselves. The water lost by drainage is fairly constant in the soil types used for vegetables and mostly percolates into and through the subsoil in the first few days after rain or irrigation; little can be done about it. Losses from evaporation and transpiration, however, vary with the atmospheric temperature and wind velocity and can be appreciably reduced by a surface mulch and windbreaks. The mulch protects the surface of the soil from the hot rays of the sun; windbreaks reduce the rate of air movement in the crop area.

The choice of mulching materials will depend on their availability in any

Plate 3.

**A Ground Crop of Tomatoes Mulched with Sawdust.** Mulching tends to prevent sharp fluctuations in soil moisture.

particular area. Dry grass, sawdust, peanut shells and megasse may be used, or, in fact, any other organic material that forms a protective cover to the soil. If the mulch is applied to a depth of about four inches, it will not only reduce evaporation but also control weed growth.

When a sawdust mulch (Plate 3) is used, residues should be raked up and removed from the area after the tomato crop has been harvested if the land is to be cropped again immediately with cabbage or similar vegetables which have a high nitrogen requirement. Even then, it will probably be necessary to increase the amount of nitrogen in the basal fertilizer normally used in the following crop. Where the following crop has a low nitrogen requirement (for example, carrot or strawberry) and the soil itself is deficient in organic matter, the sawdust may be ploughed in when the land is being prepared for planting. If nitrogen deficiency symptoms appear in such crops, standard fertilizer schedules can be supplemented by additional side dressings of sulphate of ammonia.

Although mulching is an effective method of conserving soil moisture, protection from strong winds is also desirable in the area where tomatoes are to be grown. If there is no natural shelter available, windbreaks must be established. Cowcane, maize and pigeon pea are suitable for this purpose when planted in 3-4 ft. strips across the field at intervals of, say, 2-3 chains (Plate 4). To be fully effective, they must be established some months before the tomato crop is set out in the field.

Plate 4.

**Windbreak of Cowcane.** Such windbreaks protect the tomato crop from hot, dry winds which are often associated with blossom end rot.

## CROP MANAGEMENT.

The performance of any crop depends a great deal on the production methods adopted by the grower. The better the production methods, the less the risk of setbacks from climatic and other hazards.

Where practicable, a green manure crop should be grown and turned into the ground before the initial ploughing; this practice not only improves the fertility and texture of the soil but also helps to improve its water-holding capacity. In preparing land for the tomato crop, at least one deep ploughing is essential. The soil is then worked up into a good tilth by additional cultivations with harrows or similar implements.

Since weeds compete for soil moisture they must be suppressed. Control should be effected when they are still in the seedling stage.

Although fertilizer is essential for the production of a satisfactory tomato crop, heavy applications of sulphate of ammonia are undesirable as they tend to produce excessive foliage, which in turn is conducive to the development of blossom end rot, particularly in non-irrigated areas.

The tomato plant is fairly tolerant of acid conditions in the soil. There is some evidence, however, to show that the incidence of blossom end rot increases when the plants receive insufficient calcium for normal nutrition. If, therefore, the pH of the soil is known to be low, as is commonly the case on land which has been previously cropped with pineapples, ground limestone or dolomite should be applied in the early stages of land preparation for the crop. The rate of application varies with the soil acidity from ½ ton to 1½ tons per acre.

The method of training the crop also has an influence on the incidence of blossom end rot. It is well known that tomato plants grown on the ground are less susceptible to the disorder than staked or trellised plants. This phenomenon is probably due to the fact that the free movement of air through staked and trellised plants accelerates transpiration and increases the rate of water loss from the tissues.

## PRODUCTION RECORDING OF GOATS.

Goat's milk is rapidly becoming popular in Queensland as a food for babies and for people with digestive disorders. In order to meet the increasing demand for goat's milk, the rearing of milch goats is expanding.

The Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) announced recently that a scheme for the official production-recording of purebred goats is being introduced in Queensland. The scheme will be administered by the Herd Recording Section of the Division of Dairying in the Department.

The decision to introduce the production-recording of goats follows representations from the Queensland Branch of the Goat Breeders' Association of Australia. The aim of the scheme is to enable breeders to obtain stock with known production backing.

Rules governing this scheme will follow closely the pattern of the rules governing the production-recording of purebred dairy cattle in this State.

Mr. Collins said that, initially, only a limited number of goat herds would be included in the new project, the number depending on the availability of recording officers and on the number of herds of purebred dairy cattle being recorded.

In Queensland, the greatest concentration of goat herds is in the Brisbane and Kingaroy districts.

# Queensland Beekeeping Legislation.

By C. ROFF, Adviser in Apiculture.

Legislation on beekeeping in Queensland dates from 1931, when the first Apiaries Act was passed. Primarily it gave power to deal promptly and adequately with outbreaks of diseases of bees. A natural adjunct to this was a system of approval and registration of apiary sites so that inspections for disease would be facilitated. It was also required under the Act that any bees or beekeeping materials introduced into the State should be certified as free from disease.

These basic principles were maintained in *"The Apiaries Act of* 1938," and in addition, a certain degree of control of the industry was introduced to prevent overstocking of localities or encroachment between apiaries in south-eastern Queensland, where the greater proportion of the apiaries of the State were located.

The degree of protection against encroachment, under the Act of 1938, proved to be excessive, as relatively small apiaries could hold territory that was capable of carrying a greater number of hives and, consequently, of yielding a much larger crop of honey.

New apiaries could be established only at distances further apart or further from existing apiaries than is now considered necessary. There was also a tendency to limit the increasing number of migratory beekeepers from utilising potentially profitable areas. This was substantiated by instances where beekeepers, by mutual consent, as was allowed under the Act, positioned large apiaries at short distances without detrimental effects.

To correct shortcomings of the 1938 Act, *"The Apiaries Act of* 1947" was passed. This Act came into force on 31st March, 1948, and most beekeepers are conversant with its requirements. The following explanation is given for the benefit of those who are not.

The Act is divided into parts, but for convenience it will be discussed under headings relating to requirements in declared districts, to the control of disease in the State as a whole, to the prevention of the introduction of disease and also to some general provisions.

## REQUIREMENTS IN DECLARED DISTRICTS.

The pastoral districts of Moreton, Darling Downs, Wide Bay and Burnett have been declared as Districts for the purposes of Part II. of the *Apiaries Act*.

### Registration.

Within this area of south-eastern Queensland a system of registration is provided which is somewhat different from that under the previous Act.

On 31st March in each year, every beekeeper, irrespective of the number of hives, must apply for registration and in doing so must supply certain information on a prescribed form regarding his apiary or apiaries. At a later date, he receives his certificate of registration for the period up to 31st March in the following year. No person is permitted to keep bees unless he is a registered beekeeper. No fees are charged under the Act.

Plate 1.

**A Queen-rearing Apiary in Southern Queensland.**

## Classification of Apiaries.

Unless an inspector decides that a locality has become excessively stocked, no restrictions are imposed on the placing of apiaries consisting of less than 40 hives, and for convenience these apiaries are known as Apiaries Class A.

Apiaries Class B are those consisting of 40 hives or more. *The minimum distance between apiaries of this class is set down as half a mile.*

An Apiary Class C is one consisting of at least 40 hives in which queen bees are bred for sale. A certificate indicating that an apiary is an Apiary Class C is issued only after the inspector has certified that the apiary is suitable for the purpose.

*The benefit derived from this particular classification is that no other beekeeper is allowed to commence a new apiary within a radius of one mile of an Apiary Class C.*

This restriction is provided to help the commercial queen-breeder to maintain the purity of his strain, but it may be noted that any apiary already established within the prescribed limits will not be affected. The holder of a certificate for an Apiary Class C may, however, give consent for any person to establish an apiary within the one-mile radius, subject always to Department approval.

Certain apiaries consisting of 40 hives or more may be classified as Apiaries Class D. The site of such an apiary is intended to be available as a protected site in the event of the beekeeper desiring from time to time to leave it to follow a honey flow. Before a certificate will be issued, the beekeeper concerned must possess at least 150 hives, and in effect the site must be one that an inspector considers a suitable and convenient centre for that beekeeper's activities.

*The owner of an Apiary Class D may remove any or all of his bees from that site to any other site without loss of rights, and in the period between this action and the re-occupancy of this site it is an offence for another beekeeper to establish an Apiary Class B within the half-mile radius.*

However, in any certificate issued in connection with an Apiary Class D, conditions may be imposed to ensure that such a site is properly "worked" and that other beekeepers are not being unnecessarily restricted in that area. Certificates may be revoked at any time and the number of Apiaries Class D allotted to any beekeeper is determined by the Department.

A beekeeper having either an Apiary Class B or an Apiary Class D may give his written consent for any other beekeeper to establish an Apiary Class B or D at a distance of less than half a mile. If an inspector, after considering the local situation, is of the opinion that the establishment of a new Apiary Class B or D would not prejudice an already established Apiary Class B or D, then permission may be granted for the new apiary to be established and maintained for some determined period.

## Sales and Removals.

If a beekeeper sells, establishes or removes an apiary, he must advise the Department of his action within 14 days. Forms are available for this purpose.

## Prohibited Sites.

The keeping of bees on a site may be prohibited if any provision of the Act is being contravened or not complied with, or if the site has become unsuitable for beekeeping, or if the keeping of bees there is detrimental to public interest. Such a site then becomes known as a prohibited apiary

Plate 2.

**A Migratory Beekeeper's Honey Extracting Plant at Inglewood.**

Plate 3.

**A Commercial Apiary in the Atherton District.**

site. If any person establishes or maintains an apiary upon such a prohibited apiary site he is guilty of an offence under the Act.

### Registered Brands.

It is necessary for each beekeeper to mark at least one hive in every 50 or part thereof with his registered brand number. This brand number is supplied to each registered beekeeper on his certificate of registration. The marking must be in block letters and figures not less than two inches high and must always be maintained in a legible condition. The marking is to be placed on the front of the hive, and at least one of the hives marked shall be situated in the front row of hives.

## CONTROL OF DISEASE.

The part dealing with the control and restriction of diseases and pests affecting bees is by far the most important portion of the Act and it is in force throughout the whole State.

### Frame Hives.

Linked with inspectional work is the necessity to have good facilities for examining hives, and therefore beekeepers are required to keep their bees in frame hives maintained in good condition. A badly constructed or neglected frame hive makes effective examination for the presence of disease very difficult.

### Disease Notification.

In the event of a beekeeper noticing a disease in his apiary, he must notify the Department immediately; further, he must not sell or in any way dispose of any bees or materials while they are affected with or liable to spread disease.

### Destruction of Diseased Material.

Under the Act power is given to the Minister to order the destruction of any diseased bees or disease-affected material. However, such action will follow only if an inspector has certified that in his opinion the diseased apiary is a source of danger to other bees and ought to be destroyed and the certificate is countersigned by the Director, Division of Plant Industry.

### Quarantine.

Particular areas or buildings may be declared quarantine areas for the purpose of disease control. Until a quarantine is lifted, no person is allowed to remove bees or beekeeping material into, within or out of the area.

### Disease Control Powers.

In connection with disease control. samples may be taken by an inspector for investigation, vehicles stopped and inspected, consignments directed to a quarantine area for investigation, instructions given regarding methods of treatment to be carried out, and generally any other action may be taken or ordered that may be necessary to effect efficient control.

Queensland has been comparatively free from diseases in bees in the past and every endeavour must be made to keep it so in the future. The requirements relating to diseases were designed with this in mind. and normally they involve very little inconvenience to beekeepers.

## PREVENTING INTRODUCTION OF DISEASE.

### Places of Entry.

In coastal Queensland and along the southern border, certain towns are listed as places of entry. All bees, bee combs, beeswax, hives, honey and appliances coming into this State must come through one of these listed places. By "appliances" is meant gear or apparatus that has been used in beekeeping but it does not refer to new goods. The places of entry are Bowen, Brisbane, Bundaberg, Cairns, Clapham Junction, Coolangatta, Gladstone, Goondiwindi, Killarney, Mackay, Maryborough, Mungindi, Rathdowney, Rockhampton, Texas, Townsville, Wallangarra.

Plate 4.
**Beehives Loaded for Removal to a New Apiary Site.**

Plate 5.
**Beehive Carrying Registered Brand Number.**

### Restriction on Introductions.

A consignment coming into Queensland must be accompanied by a declaration completed by the consignee and a certificate must be completed and signed by an approved officer in a Department in the State or country of origin corresponding to the Department of Agriculture and Stock in Queensland to the effect that the consignment comes from a disease-free district. A duplicate copy of this declaration and certificate shall, prior to the introduction, be forwarded to the Department of Agriculture and Stock, Brisbane.

### Power to Quarantine.

Upon arrival at a place of entry the consignment may be directed to a quarantine area for examination, and if found to be affected by disease, it may be detained in quarantine and treated in accordance with instructions.

### Power to Return or Destroy.

A consignment coming into this State without the necessary declaration and certificate shall be either returned to the sender or destroyed in quarantine.

Normally, any consignment coming to the State through a place of entry and accompanied by a properly completed certificate of freedom from disease will not be delayed.

## GENERAL PROVISIONS.

### Beekeeper to Supply Information.

A beekeeper may be required to furnish information regarding queen bees supplied by him or such statistics pertaining to beekeeping as an officer appointed under the Act may reasonably require of him.

### Abandoned and Neglected Hives.

In the event of an inspector being satisfied that any bees, hives or appliances have been abandoned and are neglected, he may take possession of them and dispose of them in a prescribed manner or in accordance with instructions from the Under Secretary. This provision may sometimes be very necessary, for an abandoned apiary can easily become a source of nuisance or danger to beekeepers in the locality.

### Honorary Field Men.

Honorary field men may be appointed and when required to do so may inquire and report on registration of beekeepers, location of apiaries, classification of apiaries, keeping of bees in frame hives, contraventions of the Act or such other matters as may be thought necessary by the Under Secretary. Honorary field men must be registered beekeepers and appointment will automatically lapse if beekeeping is relinquished by them.

## SUMMARY.

The main provisions of the Act may be briefly summarized as follows:—

(1) **Beekeepers throughout Queensland must keep their bees free from disease and in frame hives to permit effective examination.**

(2) **Beekeepers in the declared districts must register, provide descriptions of their apiaries, maintain a distance of at least half a mile between apiaries of 40 hives or more, and display their brand number on their hives.**

(3) **All introductions of bees, honey, &c., must be certified as having come from an area free from disease.**

# The Honey Flora of South-eastern Queensland.

By S. T. BLAKE (Botanist) and C. ROFF (Adviser in Apiculture).

(*Continued from page 61 of the January issue.*)

## Pumpkin.

*Botanical Name.—Cucurbita pepo* L.

*Distinguishing Features.*— A harshly-hairy, almost prickly vine sprawling over the ground or clambering over other plants, with branched tendrils, large irregularly heart-shaped leaves, and large orange-yellow bell-shaped flowers; commonly grown as a crop. (Plates 145-146).

*Description.*—This is an annual plant covered with coarse, stiff, almost prickly hairs. The stems spread out from the root and may be many yards long, sprawling over the ground or scrambling over other plants; they are hollow. The leaves are irregularly heart-shaped with a wavy margin, usually about 6-10 in. long and wide, with long stalks. A branched tendril comes from the stem where the leaf-stalk

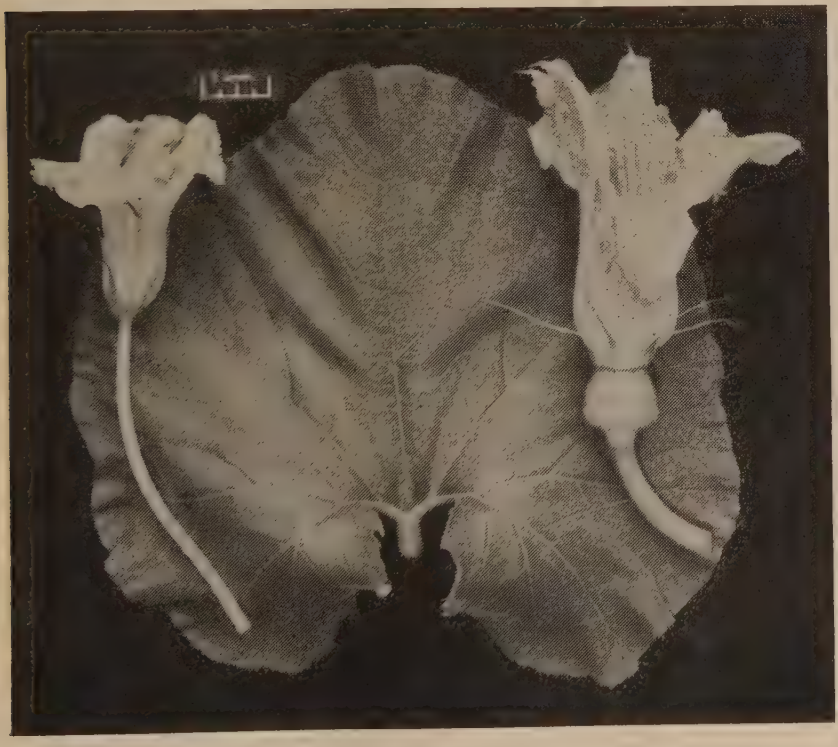

Plate 145.

**Pumpkin (Cucurbita pepo).** Leaf and male and female flowers.

joins it. There are distinct male and female flowers. Both are orange-yellow with green veins, bell-shaped, about 3½ in. long and wide, each borne on a stalk close to a leaf. The five sepals are green and almost thread-like, and the five petals are joined together for the greater part to give the bell-like appearance of the flower. The males are produced first, and are sometimes clustered; the stamens are united in a stalked cylindrical mass in the middle of the flower. The females are usually produced later, towards the ends of the older stems; they have an egg-shaped ovary beneath the petals which later becomes the pumpkin, and a short style with curly stigmas within the bell; there are no stamens.

*Distribution.*—Widely grown as a crop and frequently found as a stray along roadsides, on waste ground, and in old cultivation paddocks.

*Usual Flowering Time.*—Summer months.

*Colour of Honey.*—Medium amber.

*Importance as Source of Honey.*—Nil.

*Importance as Source of Pollen.*—Major.

*General Remarks.*—Pumpkins yield good pollen supplies over lengthy flowering periods. Districts in which this crop is grown extensively are often amongst the best for beekeeping.

Only insignificant quantities of honey are obtained from pumpkin.

Plate 146.

**Pumpkin (Cucurbita pepo).** Field at Tent Hill.

[TO BE CONTINUED.]

# What Do Your Fowls Eat?

By E. O. BURNS, Division of Marketing.

If you were to take any six or seven poultry farmers in south-eastern Queensland, the odds are that you would find one of them without any worries about the price of mash—because he doesn't use it.

The proportion is not so high among full-time poultry farmers, but even in this group, one out of 10 never feeds mash.

These facts came out of a survey made by the Marketing Division last June into feeding practices on poultry farms in south-eastern Queensland. The object of the survey was to provide information in regard not only to farm management practices, but also to demand for certain feedstuffs.

The main conclusions can be summarised as follows:—

(1) In all, 85 per cent. of poultry farmers use mash, and 93 per cent. use grain, in their poultry rations.

(2) Four out of every five farmers feed mash and grain together.

(3) Three out of every four farmers who feed mash use commercial (factory-prepared) mash only.

(4) Out of every 10 farmers, 6 feed only dry mash, 1 feeds only wet mash, and 3 feed both.

(5) Half the farmers who use grain use only wheat, but 84 per cent. use wheat either alone or in addition to other grains.

## THE SAMPLE.

The sample used in this survey comprised 128 farmers selected at random from all the administrative districts of the South Queensland Egg Marketing Board. There were 31 farmers from District 1 (North Coast), 22 from District 2 (North Metropolitan), 37 from District 3 (South Metropolitan), 19 from District 4 (West Moreton), and 19 from District 5 (Darling Downs).

Table 1 shows the number and percentage of farmers and the birds they control in the different flock size groups.

TABLE 1.

Distribution of Sample in Flock Size Groups.

| Flock Size. | Number. | | Percentage. | |
|---|---|---|---|---|
| | Farmers. | Birds. | Farmers. | Birds. |
| 1,000 and over .. .. | 36 | 80,176 | 28 | 73 |
| 500 to 999 .. .. | 26 | 18,197 | 20 | 17 |
| 251 to 499 .. .. | 20 | 7,417 | 16 | 7 |
| 100 to 250 .. .. | 16 | 2,354 | 13 | 2 |
| 1 to 99 .. .. | 30 | 1,474 | 23 | 1 |
| | 128 | 109,618 | 100 | 100 |

There were 39 full-time poultry farmers, 41 who combined poultry raising with other occupations, and 48 for whom poultry raising was only a spare-time occupation For convenience we will call these groups full-time, part-time and spare-time respectively.

## FEEDING SYSTEMS.

There are many types of feeding systems, but all that were in use on the sample farms could be analysed into mash, grain, pellets, or combinations of these. The overwhelming proportion (77 per cent.) feed mash and grain, while a further 6 per cent. feed pellets in addition. In all, 85 per cent. of farmers controlling 91 per cent. of birds feed mash, either with or without grain and pellets, and 15 per cent. controlling 9 per cent. of birds do not feed mash.

Table 2 shows the percentages of growers who adopt various methods of feeding, and the percentages of birds fed under each method.

TABLE 2.

TYPES OF FEEDING SYSTEMS IN USE ON SAMPLE FARMS.

| — | Farmers. | Birds. |
|---|---|---|
| | Per cent. | Per cent. |
| Mash and Grain .. .. .. .. | 77 | 79 |
| Mash, Grain and Pellets .. .. | 6 | 9 |
| Mash only .. .. .. .. | 2 | 3 |
| Mash .. .. .. .. | 85 | 91 |
| Grain only .. .. .. .. | 6 | 1 |
| Grain and Pellets .. .. .. | 4 | 5 |
| Pellets only .. .. .. .. | 5 | 3 |
| No mash .. .. .. | 15 | 9 |
| | 100 | 100 |

The proportion of growers who feed mash in the smallest size category (1–99) is only 71 per cent., which is considerably smaller than in the other size groups. The highest proportion of mash feeders, however, was found in the second smallest size group (100–250), where the proportion was 94 per cent., closely followed by the largest group (1,000 and over), with 92 per cent.

Fewer farmers in the spare-time category feed mash than full-time and part-time operators. Also of interest is the fact that all purely Leghorn flocks in the survey were fed mash and grain, whilst mash was fed to only 77 per cent. of Crossbreed flocks.

The proportions of farmers feeding mash ranged from 82 to 92 per cent. in all districts, except District 5 (Darling Downs), where the proportion was only 74 per cent. The remainder of the flocks in this district (26 per cent.) were fed solely on grain. This is a surprisingly high proportion when compared with the overall average of 6 per cent.

## TYPE OF MASH.

Most farmers who feed mash use commercial (factory-prepared) mash and feed it dry. Figure 1 shows the percentages of commercial and farm-mixed types and whether the mash is fed wet or dry. Almost

one in every three farmers uses both wet and dry mash. It is not known whether this is done at the same time—perhaps for different classes of fowls—or at different times of the year.

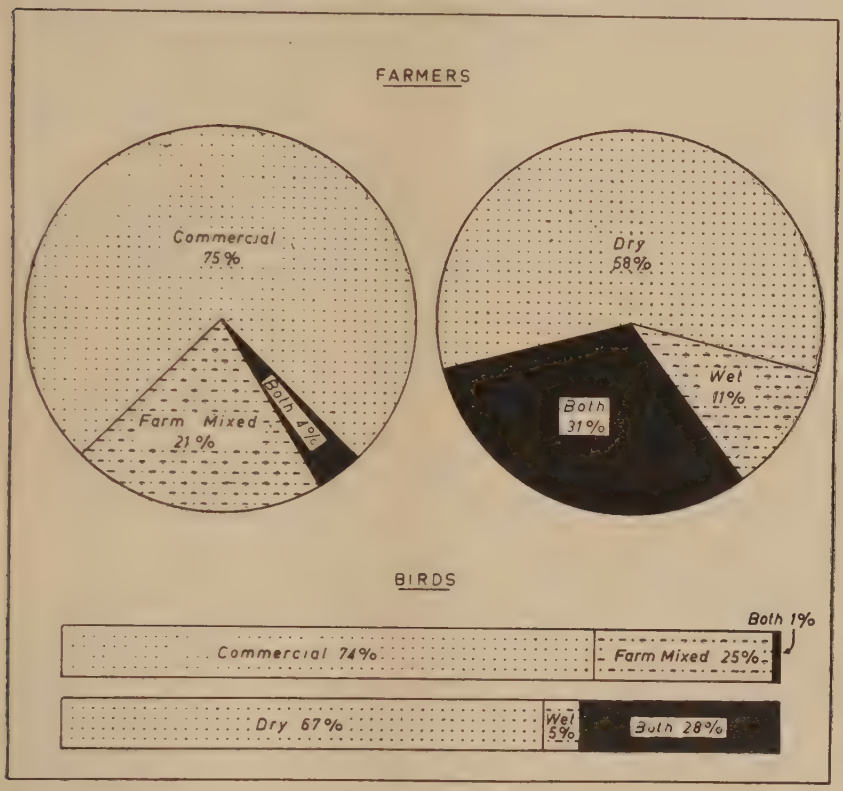


Fig. 1.

**Types of Mashes in Use on Sample Farms.**

Farm-mixed mash is used solely by 21 per cent. of all farmers who use mash and a further 4 per cent. mix their own and also use commercial brands. A higher proportion of full-time and spare-time poultry farmers mix their own mash than part-time operators. Only 8 per cent. of part-time poultry farmers who use mash always prepare their own, compared with 31 per cent. full-time and 24 per cent. spare-time.

Spare-time operators generally have very small flocks and the time involved in mixing the mash is not as significant as it would be for the larger part-time operators, whose time is more limited by the greater size of their flocks. To some small poultry raisers also, keeping poultry is probably more in the nature of a hobby than an income-producing occupation. This would result in more time being devoted to the poultry than their economic value might warrant. It might also explain to some extent the fact that the proportion of spare-time and small-sized flock operators who feed wet mash is much higher than the proportion of full-time and large-sized flock operators.

The highest proportion of farm-mixed mashes was fed to Crossbreed flocks, which represent also the lowest proportion of mash consumers. The greatest departures from the average mash feeding customs were found in District 4 (West Moreton), where 94 per cent. of the survey poultry farmers use commercial mashes only, and District 5 (Downs), where 50 per cent. use farm-mixed mashes either solely or in combination with commercial types, compared with the average of 25 per cent.

## TYPE OF GRAIN.

Less than half of the growers sampled who include grain in their birds' diet use wheat exclusively, but 84 per cent., controlling 72 per cent. of birds, feed it either alone or in combination with other grains. Table 3 indicates the types of grain used.

TABLE 3.

TYPES OF GRAIN IN USE ON SAMPLE FARMS.

| | Farmers. | Birds. |
|---|---|---|
| | Per cent. | Per cent. |
| Wheat only .. .. .. .. | 48 | 39 |
| Wheat and Maize .. .. .. | 12 | 13 |
| Wheat and Sorghum .. .. .. | 12 | 6 |
| Wheat, Maize and Sorghum .. .. | 12 | 14 |
| Wheat .. .. .. .. | 84 | 72 |
| Maize only .. .. .. .. | 2 | 0·5 |
| Sorghum only .. .. .. .. | 10 | 21 |
| Maize and Sorghum .. .. .. | 4 | 6·5 |
| No wheat .. .. .. | 16 | 28 |
| | 100 | 100 |

Over 90 per cent. of flocks in the "501–999" group are fed wheat, but less than 80 per cent. in the "1,000 and over" and the "1–99" groups. This is another instance of the tendency of the small spare-time operator to adopt somewhat similar feeding practices as the large full-time farmer.

Of interest is the fact that all farmers in Districts 2 (North Metropolitan) and 5 (Downs) fed wheat either alone or in combination, whereas only 68 per cent. did so in District 1 (North Coast).

Figure 2 shows the percentage of growers who use the main grains either singly or in combination. More growers feed sorghum than maize. Sorghum is fed on at least half the farms with 1,000 and over, with Crossbreed flocks only and in District No. 5 (Downs). Wheat plays a higher part in the ration of one-breed flocks comprised of either Australorps or Leghorns than of Crossbreed or mixed flocks, which tend to be fed greater proportions of maize and sorghum.

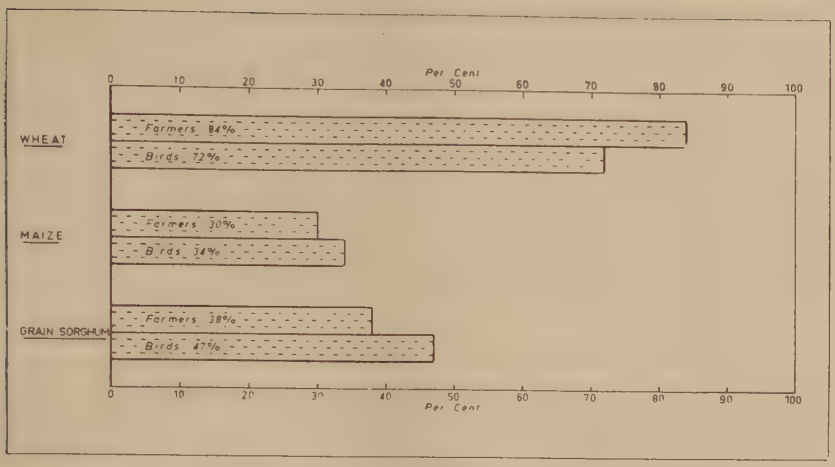


Fig. 2.

**Usage of Main Grains, Either Singly or in Combination.**

## BREEDS.

Tables 4 and 5 show the breeds favoured by the sample farmers.

TABLE 4.

Breeds of Sample Flocks.

| — | Farmers All Flock Sizes. | Farmers 1,000 birds and over. |
|---|---|---|
| | Per cent. | Per cent. |
| Australorps only .. .. .. | 34 | 33 |
| Crossbreeds only .. .. .. | 16 | 11 |
| Leghorns only .. .. .. .. | 10 | 9 |
| Mixed Flocks .. .. .. .. | 40 | 47 |
| | 100 | 100 |

Australorps are the most favoured breed. These are kept exclusively on 34 per cent. of the sample farms. Altogether 69 per cent. of the farmers run Australorps, either singly or in conjunction with other breeds. Crossbreeds are run on 44 per cent. of the farms, either singly or in combination with other breeds, and exclusively on 16 per cent. of the farms. Leghorns are favoured as the sole breed on 10 per cent. of the farms, but are run either alone or in combination on 36 per cent. of the farms.

TABLE 5.

Percentage of Farmers with Different Breeds, either Singly or in Combination.

| — | Farmers All Flock Sizes. | Farmers 1,000 birds and over. |
|---|---|---|
| | Per cent. | Per cent. |
| Australorps .. .. .. .. | 69 | 81 |
| Crossbreeds .. .. .. .. | 44 | 50 |
| Leghorns .. .. .. .. .. | 36 | 31 |
| Other Breeds .. .. .. .. | 9 | 3 |

Only 9 per cent. of the farmers run breeds other than Australorps, Crossbreeds and Leghorns. The proportion with other breeds is highest in the small-sized flocks and lowest in flocks with 1,000 birds and over.

Mixed flocks containing two or more varieties account for 40 per cent. of all flocks, the proportion being highest in the "100–250" and "1,000 and over" categories, and lowest in the "500–999" category.

Full-time and spare-time farmers have a higher proportion of mixed flocks and a higher proportion of Crossbreeds than part-time operators, the majority of whom run exclusively Australorp flocks.

## COMPARISON WITH B.A.E. SURVEY, 1954.

The Bureau of Agricultural Economics survey at the end of 1954 was designed to examine the economic structure of egg production and to analyse the factors influencing efficiency.

The Marketing Division survey was designed solely to analyse feeding practices as an aspect of farm management and no attempt was made to cover the same field as the B.A.E. survey.

Nevertheless, there were a few points at which the two surveys almost touched, and although there is no exact correspondence a comparison at these points may be of some interest.

The B.A.E. survey was confined to flocks consisting of 1,000 or more layers. The Marketing Division's survey included flocks of all sizes. In the comparison following, the size group "1,000 and over" (which is not exactly the same as the B.A.E.'s criterion, which is restricted to layers) will be shown separately as well as the results for all size groups.

### Breed of Flocks.

Table 12 of the B.A.E. report analyses flocks in the different States on the basis of Crossbreed percentages, White Leghorns, and other breeds. The Queensland figures from this Table and also Table 4 in this article have been recast to enable the following comparison to be made:

| | B.A.E. Survey 1,000 and more Layers. | Marketing Division Survey. | |
|---|---|---|---|
| | | 1,000 birds and over. | All Flocks. |
| | Per cent. | Per cent. | Per cent. |
| 100 per cent Crossbreeds .. | 11 | 11 | 16 |
| 100 per cent White Leghorns | 11 | 9 | 10 |
| Mixed Flocks .. .. | 34[a] | 47[b] | 40[b] |
| Other Breeds .. .. .. | 44[c] | 33[d] | 34[d] |

*a* Restricted to Crossbreeds in conjunction with other breeds.
*b* Flocks containing two or more breeds.
*c* Breeds other than Crossbreeds and White Leghorns; mainly Australorps.
*d* Australorps only.

The two surveys reveal a close correspondence in respect of the two categories in which almost exact comparison is possible. The results are not inconsistent in the remaining two categories if due regard is paid to the footnotes.

### Grain Utilization.

The Marketing Division survey showed 94 per cent. of farmers with 1,000 birds and over using grain, compared with the B.A.E.'s 100 per cent., and a somewhat smaller proportion using wheat only.

| | B.A.E. Survey. | Marketing Division Survey. | |
|---|---|---|---|
| | | 1,000 birds and over. | All Flocks. |
| | Per cent. | Per cent. | Per cent. |
| Feed Grain .. .. .. | 100 | 94 | 93 |
| Wheat only .. .. .. | 50 | 41 | 48 |
| Other .. .. .. .. | 50 | 59 | 52 |

### Types of Mash Used.

Finally, the only other comparison possible between the two surveys concerns types of mash. Here again, although the Marketing Division survey showed a slightly higher proportion of growers using manufactured mashes, the findings generally are consistent.

| | B.A.E. Survey. | Marketing Division Survey. | |
|---|---|---|---|
| | | 1,000 birds and over. | All Flocks. |
| | Per cent. | Per cent. | Per cent. |
| Farm Mixed .. .. .. | 33 | 27 | 21 |
| Manufactured .. .. .. | 67 | 73 | 75 |
| Both .. .. .. .. | .. | .. | 4 |
| | 100 | 100 | 100 |

## DAIRY EXTENSION ADVISORY COMMITTEES.

Three newly-formed District Dairy Extension Advisory Committees are now providing a service for farmers in their areas, the Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) said recently.

The committees have been set up at Oakey, Gympie and Atherton. Membership in each district consists of three farmers who are prominent members of the Queensland Dairymen's Organisation and three Departmental officers. Inaugural meetings last November have been followed by meetings each month.

Formed with the objective of assisting dairymen to improve their farming practices, the committees are on trial for 12 months. Progress reports from them at the end of this period will be used to determine whether the scheme will be extended to other dairying districts of the State.

Mr. Collins said that, even at this early stage, the scheme appeared to be developing along lines which will be beneficial to dairy farmers. He was confident that it could make a worthwhile contribution towards increasing the prosperity of the dairy industry.

# Genetics and Beef Cattle Production.

By G. I. ALEXANDER, Cattle Husbandry Branch.

Genetics, or the study of heredity, has in recent years undergone a change in outlook where the breeding of livestock is concerned. There has been a progression from the basic simple principles of Mendel to the broader scope of "population" genetics of present-day geneticists. This change has come from the discovery that most of the characters of economic importance in livestock are controlled by large numbers of hereditary factors which interact in varying degree.

These hereditary factors are known as genes. They may be thought of as tiny particles which occur as pairs in the cells of animals. Sometimes the two genes of a pair are alike, each affecting a particular character of the animal in the same way. Sometimes they are unlike. In this case, either one dominates the other or it reduces the effect of the other.

When two animals are mated, one gene of every pair in the male parent and one gene of every pair in the female parent pass into each of the offspring, and the characteristics of the offspring are determined by the pairing of the genes in its body.

If Plate 1 is examined, the role of genes in transmitting characteristics will become clearer. The diagram refers to horns in cattle and the opposite characteristic of polledness.

Some of the characters in beef cattle are controlled by single pairs of genes. Horned and polled characters as exhibited by the Aberdeen-Angus and its crosses are examples of this. A polled bull which possesses both the genes for polledness will always produce polled offspring when mated to horned cows, as the polledness gene is dominant over the gene for horns. However, these polled offspring have only the single gene for polledness, and if the male is mated to horned cows there will on the average be only 50 per cent. of polled progeny in the following generation.

This is a case where one gene (that for the polled character) is dominant over that for the horned character, since the possession of one gene for polledness will ensure polledness.

However, not all characters controlled by a single pair of genes are dominant. Coat colour in Shorthorns is an example of equi-dominance in which roan is the result of mating red and white animals. There is, in addition, a gradation between complete dominance and equi-dominance in most of these characters controlled by a single pair of genes, so much variation can be found between the two extremes.

## HERITABILITY.

Most of the characters of economic importance, such as milk production, birth weight, weaning weight, growth rate and slaughter weight for age, are controlled by a large number of genes. These characters are also influenced to a varying degree by the environment of the animal, so some measure of the relative influences of environment and heredity is desirable.

Heritability is a measure of the degree of control an animal's breeding has on any observed character. Say, for example, a line of calves by a

particular bull was 10 lb. heavier than those by another bull, then we want to know just how much of this increased weight is due to improvement in inheritance of the offspring. As yet, there are no estimates of heritability for beef cattle in Australia, but this has a high priority in beef cattle research.

The following estimates have been made in the United States of America:—

| | % |
|---|---|
| Birth weight .. .. .. | 53 |
| Weaning weight (at 205 days of age) .. .. .. | 28 |
| Gain in the feed lot (post-weaning) .. .. .. | 65 |
| Carcase grade .. .. .. | 33 |
| Area of eye muscle .. .. | 68 |

Half of the heritability of a character is the result of the sire's influence. Thus, selection of a bull that weighed 10 lb. more at birth than another would result on the average in an increase of 2·65 lb. (53 per cent. of 5 lb.) in the birth weight of the heavier bull's calves. A 100 lb. difference in weaning weight between two bulls would result on the average in a difference in the weaning weight of the calves of 14 lb. (28 per cent. of

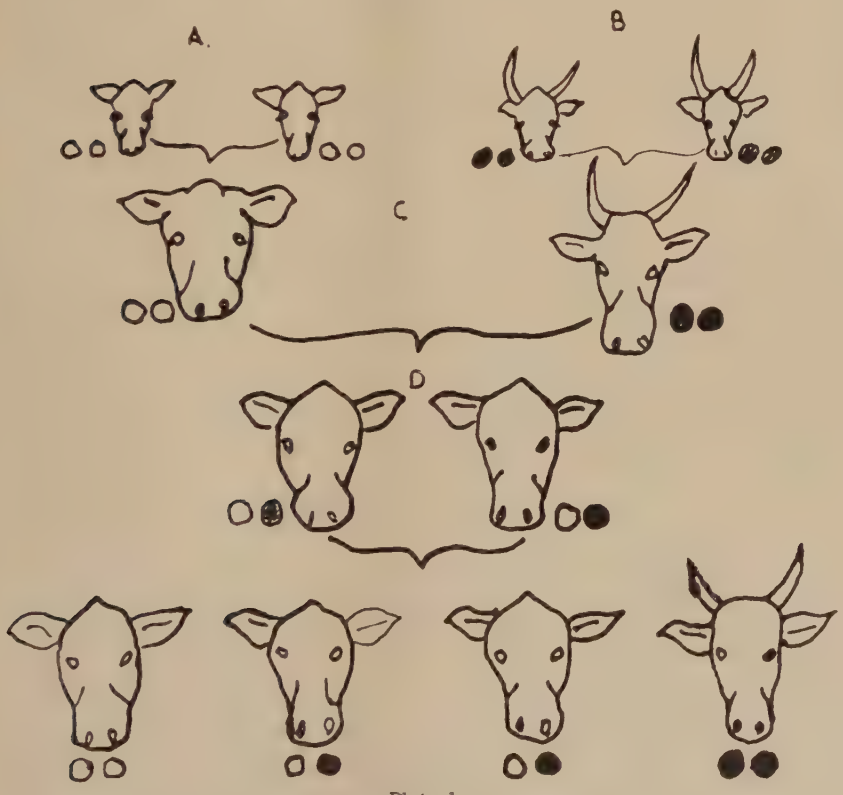


Plate 1.

**Diagram Showing how Polledness is Transmitted.**—The character for polledness is represented by an open circle and that for horns by a filled circle. At the top, two polled animals are mated to give a polled animal and two horned animals to give a horned animal. If these two animals are mated, they give polled offspring. Two such polled progeny when mated give three polled animals and one horned in every four on an average. Two of the polled offspring have the character for horns as well as for polledness, and though polledness is dominant in them, some of their progeny are likely to be horned.

50). If an equal degree of selection of the dams was made, then the difference between the progeny and the parents would be doubled and thus the estimate of heritability fully realized.

## SELECTION.

Methods by which we can improve the economic characters of our stock have been carefully studied. The method used by stud masters has been that of selection. They selected superior bulls and mated them to superior cows, and so, by careful culling of the progeny and controlled breeding, have developed the high standard of excellence of our British beef breeds.

There are a number of aids to selection, comprising lifetime averages, pedigree estimates, and progeny tests.

### (1) Lifetime Averages.

In selection and culling of stock, cognisance should be taken of the variability of an animal's productive performance during its lifetime. A cow should not be selected or culled from the herd on the basis of a single calf, but rather on the score of all her progeny. It is possible that the environment may have had a greater effect on that individual calf than usual.

Similarly, with bulls when they have been used in the herd, it is preferable to judge their worth on that of the progeny over a period of several years rather than in one year, although this is not as important for selection of bulls as it is for cows.

### (2) Pedigree Estimates.

Pedigree estimates are a natural step from lifetime averages. In the pedigree estimate, the intending purchaser judges the animal by the standard of performance of its parents. In these cases the lifetime averages of the parents should be considered. This involves examining the previous calf drop of the dam and seeing if they were uniformly good, and also examining the other progeny of the sire and assuring oneself of their general high standard.

### (3) Progeny Tests.

Progeny tests are a useful tool of the stud breeder. They can assist him to select cattle for characters of low heritability, for characters which can only be observed after slaughter, or where there is the possibility of some undesirable hereditary defect being transmitted.

They enable the stud master to detect whether a bull is always going to breed true for a particular character. For example, should the breeder suspect a bull of not possessing the two genes for polledness he may readily determine this by test-mating the bull with about five horned cows. This is a simple type of progeny test.

While progeny testing is used mainly to determine the degree of inheritance of carcase characters, it is also used to check on a bull's ability to transmit superior growth rate to his progeny. While on the average he can be expected to do this, it will not always be the case. The progeny test will determine whether he does in fact do so.

The progeny test is highly desirable in the selection of purchased bulls. Many breeders more or less unknowingly use a progeny test when they critically assess a bull's merit on the basis of his progeny's performance.

## THE BASIS OF SELECTION.

In beef cattle, the basis of selection varies with the class of country, but the general basis is ability to thrive in the environment. Therefore, the fundamental approach is to select those cattle which do best on the particular property.

Another factor which must be considered is carcase quality. This is governed by the environment. On some

properties it is not possible for cattle to be fattened and sold until four years of age, whereas on others bullocks may be sold as fats at between two and three years of age.

Thus the selection of the stock would have to be on a different basis even within the one breed. Nevertheless in both cases the stock with the greatest weight for age are those which are most suited to the particular property.

## SELECTION OF THE BREEDING COW.

The type of breeding cow selected for any particular property depends on the conditions under which she is required to run. The manner in which an animal grows determines whether she will have an excellent conformation or not. Admittedly, heredity plays a part, but the environment is the main factor which determines whether an animal will finally grow into a desirable type of carcase. Lack of feed at critical times in an animal's life may drastically alter its conformation and the animal is said to have "run out" or is "fine boned." Certain breeds are better able to withstand these periodic shortages in the feed supply and to recover from them, and so are usually to be found in less favoured areas.

Sometimes these droughts or near-droughts cause a drastic lowering of the calf drop and there may be so few replacement heifers that no culling can be carried out. If this situation continues over a period, the cow herd will be found to have "run out."

In selection of heifers, the initial culling of the poorer types may be carried out at weaning time. The conformation of the heifers at this time is a reasonably good guide to their ability to thrive and is also a criterion of the milking quality of their dam.

Provided she has no serious defects in conformation, the dam which has raised a good calf without falling away excessively in condition is the cow on which to build your breeding herd. Selection of quiet, easily handled cows should be practised, but quite often wildness is merely a reflection of the management of the property.

The heifer calves from cull cows should not be retained in the breeding herd and should be sold off as speyed heifers.

As long as a cow can produce a calf with a reasonably high birth weight and rear it well so that it will grow into as good a bullock as the property can produce, she should be retained in the breeding herd. The longer good quality cows can be retained as breeders the lower is the herd replacement rate required and so the greater degree of selection which may be practised in the heifer population. This makes for greater improvement in the quality of the stock.

Reliability in breeding is another feature which should be considered in the breeding cow. The cow which breeds irregularly, having a calf only every 18 months to two years, should not be tolerated, as she is an uneconomic unit in the herd. She should be culled to make way for another cow which, even if not as good as regards the quality of her calves, is nevertheless more economic by reason of producing them regularly.

## SELECTION OF THE BULL.

An intending purchaser of a beef bull should consider his performance from calfhood to time of inspection. Many stud breeders weigh their cattle regularly and will be able to tell intending purchasers the relative growth rates of their various sale bulls. The selected bull, besides possessing good conformation, should show superior weight gains for his age as compared with other bulls.

Growth rate is highly heritable and a young bull with good growth rate and coming from stock which in turn showed good weight gains during their growth is a better proposition for an intending purchaser than a bull with superior conformation but a poor growth rate.

TABLE 1.

BULLS IN DESCENDING ORDER OF MERIT IN RELATION TO THEIR POST-WEANING GAIN.

| Bull No. | Weaning Weight (21–8–54). | Final Sale Weight (5–3–55). | Post-Weaning Gain. |
|---|---|---|---|
| | Lb. | Lb. | Lb. |
| 243 | 427 | 851 | 424 |
| 312 | 364 | 764 | 400 |
| 261 | 400 | 796 | 396 |
| 253 | 420 | 808 | 388 |
| 284 | 412 | 796 | 384 |
| 257 | 379 | 726 | 347 |
| 266 | 408 | 746 | 338 |
| 249 | 404 | 733 | 329 |
| 238 | 466 | 746 | 280 |
| 299 | 451 | 684 | 233 |
| 258 | 336 | 564 | 228 |

Note how post-weaning gain bears no relationship to weaning weight.

If a bull is bought as a weaner, his ability to mature rapidly under the conditions on the purchaser's property will be a further indication of his ability to sire rapidly growing stock.

Ideally, bulls should have been raised in the same environment as that in which they are to be used. A superior bull may be purchased and mated with a randomly selected group of cows. This mating should be regarded as a progeny test and the growth rate of the progeny compared with that of the herd as a whole. In order that the maximum value may be obtained from the purchased bull, he should be used as a yearling over this test group of cows so that some idea of his worth may be gauged before he is three years old. If he demonstrates that he is a herd improver he should then be mated to specially selected thrifty cows and the best of his male progeny kept as bulls for the general herd.

## HEIFER CALF IDENTIFICATION SCHEME.

Queensland's heifer calf identification scheme, which was introduced in May last year, has been received with enthusiasm by dairy farmers who are production-recording their cows. By the end of December, 7,700 heifer calves had been tattooed in the ears to permanently identify them. They are all from unregistered grade herds.

Stating this recently, the Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) pointed out that the calf identification service enables a farmer to select his breeding stock with a complete knowledge of its ancestry.

The service is provided without charge by the Department to the 1,250 herds being production-recorded under the Group Herd Recording Scheme. It affects the progeny of more than 50,000 dairy cows now under test in Queensland.

Positive identification of female dairy cattle is essential for herd improvement purposes. Farmers who plan to breed from their highest producers, as indicated by production records over a number of lactations, must know beyond doubt that each animal has the production backing attributed to it. The value of many years' careful breeding work may be lost if the heifer progeny cannot be identified correctly.

Mr. Collins said that calf identification enables farmers to keep a reliable breeding record of all animals on their farms. Such information is of great value when used in conjunction with herd recording results to plan future breeding programmes for the herd.

# Brahman Cattle Grow Faster Than British in the North.

By W. F. MAWSON, Senior Adviser in Cattle Husbandry.

**In a trial conducted in North Queensland for 2½ years, Brahman crossbred steers grew at an average rate of over 12 oz. a day, as against 10½ oz. for the British breeds, and during the period gained 698 lb., compared with 607 lb. for the British breeds.**

**The dressed carcases of the Brahman crossbreds were heavier and of better quality.**

This article records a series of weighings of 46 head of beef cattle on "Wairuna" station, in tropical Queensland. The cattle comprised equal numbers of British breeds and Brahman crossbred steers. They were weighed at approximately monthly intervals from November 1952 to May 1955. Following slaughter, individual weights and grades were obtained.

Details of the location, soils and pastures were given in this journal for May 1954. The weighing technique was also discussed in that issue (see also Plates 1 and 2 in this article), and particulars of the weather and pasture conditions during the first year of the observations were also recorded.

## WEATHER AND PASTURES.

On "Wairuna" the 1953 wet season ended abruptly in February, and all the grasses seeded in March. They were severely frosted during the winter, the areas of couch grass alone providing green feed. The only relief came with a fall of rain in August which provided a month's pasture growth.

Plate 1.

**Cattle Moving Up the Crush for Weighing.**

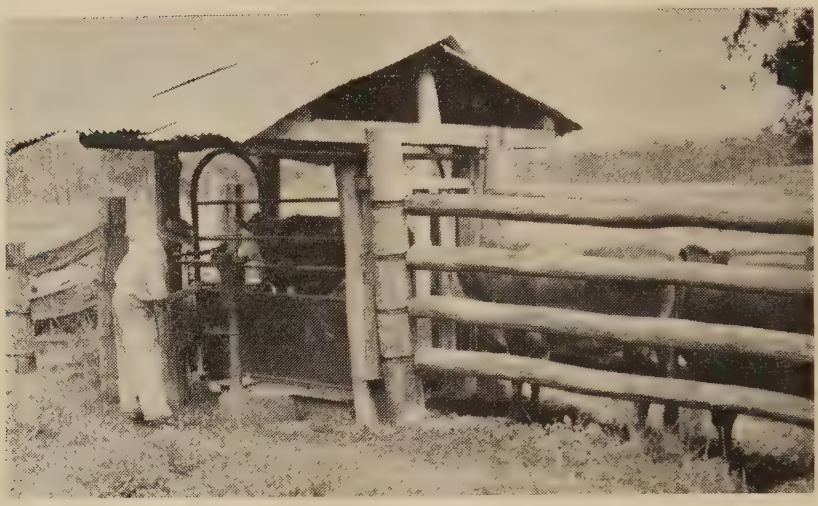

Plate 2.
**Cattle Weighing in Progress.**

Very few and light storm rains in November and December failed to produce any worthwhile pasture growth and it was not until the following wet season commenced in January 1954, that any appreciable growth occurred. Heavy stocking of the paddock allied with a heavy tick infestation caused a temporary setback to the cattle in May, but on dipping and transfer to another paddock it was quickly overcome. The 1954 winter was very mild and subsequent good spring rains produced early pasture growth. The 1955 wet season ensured good pastures until well towards April, when the trial was completed.

The total rainfall for 1953 was 2,221 points; that for 1954, 3,444 points; 2,606 points were recorded in the first four months of 1955.

In general, 1953 was a dry year with a cold winter. The following year was one of the best on record, there being a very well distributed rainfall and no damaging frosts.

## DESCRIPTION OF CATTLE.

The cattle used in these investigations were weaners at the start of weighing. They were all steers bred on the property and comprised an even group of 25 head of British breed and an even group of 25 head of Brahman cross. The two groups were regarded as being representative of the commercial cattle on the property and were evenly matched as regards age. The age range at the commencement of weighing was 7-11 months.

The British breed group consisted of 12 Shorthorn steers and 13 Shorthorn-Hereford cross steers.

The Brahman cross steers were $\frac{3}{8}$ Brahman and $\frac{5}{8}$ British breed, obtained by using $\frac{3}{4}$-bred Brahman bulls ($\frac{3}{4}$ Brahman, $\frac{1}{4}$ Shorthorn) on 17 Shorthorn cows and 7 Shorthorn Hereford cross cows.

During the first year one Brahman cross steer died from an unknown cause. Another was missing for the last eight months of the investigation. The crossbred group was thus reduced to 23 head at slaughter. Two steers were also eliminated from the British group. One failed to make reasonable growth and the second showed signs of some Brahman blood as he developed.

Plate 3.

**Some of the Crossbred Group in May, 1955.**

In assessing results the four head referred to have been entirely ignored and all growth figures and comparisons are based on 46 head of cattle—23 in each group.

## MANAGEMENT.

At all times both groups of cattle were run together as one mob, subject to exactly the same conditions. Because of the necessarily frequent mustering for weighing purposes, the stock had to be depastured within reasonable proximity of the scales, which are attached to yards near the homestead. It is thus probable that the pasture available to these cattle was overgrazed more than the average for the property. Two paddocks were available and cattle were moved when necessary.

Plate 4.

**Some of the British Breed Group in May, 1955.**

All cattle were given a light spraying with DDT at monthly intervals during summer for control of buffalo fly. This was discontinued after April when the fly trouble abated.

Dipping in DDT for cattle tick control was done at the following times: January and April, 1953; January, May, July and November, 1954; and April 1955. It was generally observed that the British cattle carried the greater tick burden. The steers with long, woolly coats always seemed to carry the greatest number of ticks.

Throughout the investigation it was plain that the Brahman crossbred group had shorter, sleek hair. In addition they shed their winter hair several weeks earlier than the British group.

No supplementary feeding, special grazing or other special practice was employed during the course of this investigation. Husbandry practices were typical of the area, with the possible exception that during the spring months the pasture available to the weighed cattle was limited. This was because the cattle had to be in paddocks fairly close to the scales and could not be moved to farther areas which were more favourable.

## RESULTS OF WEIGHING.

Plate 5 shows the average growth rate of both groups. This and Table 1 illustrate the distinct pattern of growth. There is a fairly rapid increase in weight during late summer and autumn, followed by a loss of weight in midwinter and spring. A further increase follows until the following winter, when another drop occurs. An unusually mild winter was experienced in 1954 and no appreciable loss of weight occurred. However, weights were practically stationary for the six months from April to October.

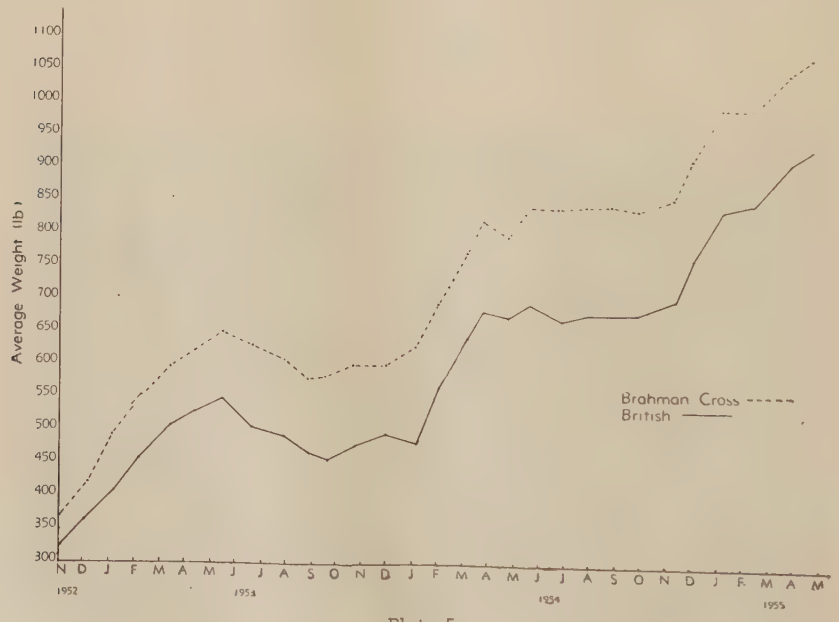


Plate 5..

**Graph Showing the Growth Rate of the Cattle.**

TABLE 1.

AVERAGE WEIGHTS AT SELECTED TIMES FOR THE BRITISH BREED AND BRAHMAN CROSS CATTLE TO ILLUSTRATE THE GROWTH PATTERN.

| Date. | Weight (Lb.) | | Remarks. |
|---|---|---|---|
| | British Group. | Brahman Cross Group. | |
| 5–11–52 | 322 | 370 | Commencement of trial |
| 22–5–53 | 548 | 655 | Weight at end of 1952–53 growing season |
| 28–9–53 | 462 | 579 | Lowest weight recorded during the 1953 dry season |
| 14–1–54 | 485 | 627 | Between this weighing and one on 13–2–54 the cattle regained the weight recorded for 22–5–53 |
| 5–5–54 | 673 | 818 | Weight at the end of the 1953–54 growing season. Between this weighing and one on 13–7–54, the cattle ceased to gain weight |
| 18–10–54 | 679 | 837 | No appreciable weight gain or loss was recorded during the period 5–5–54 to 12–10–54 |
| 9–5–55 | 928 | 1,068 | Final weighing |

Stock lost less condition than usual during the very mild winter of 1954 and prevented the testing of the belief that steers and bullocks lose comparatively less weight over winter and spring as they become older.

The Brahman crossbreds showed to greater advantage when young. They were 49 lb. heavier at the commencement and 108 lb. heavier six months later. This difference increased to 146 lb. at 2-year-old but was reduced to 140 lb. at 3-year-old. Over the last year, with good conditions prevailing, the British group made a net weight gain of 235 lb., compared with 229 lb. for the Brahman crossbreds (see Table 2).

In the 30-months' period of weighing the British group gained 607 lb. (an average of 0·66 lb. per day), while the Brahman crossbreds gained 698 lb. (an average of 0·76 lb. per day).

TABLE 2.

LIVEWEIGHT GAIN IN POUNDS.

| Period. | British Group. | Crossbred Group. | Advantage to Crossbreds (Lb.) |
|---|---|---|---|
| 5–11–52 — 22–5–53 .. .. | 227 | 284 | + 57 |
| 22–5–53 — 4–6–54 .. .. | 145 | 185 | + 40 |
| 4–6–54 — 9–5–55 .. .. | 235 | 229 | — 6 |

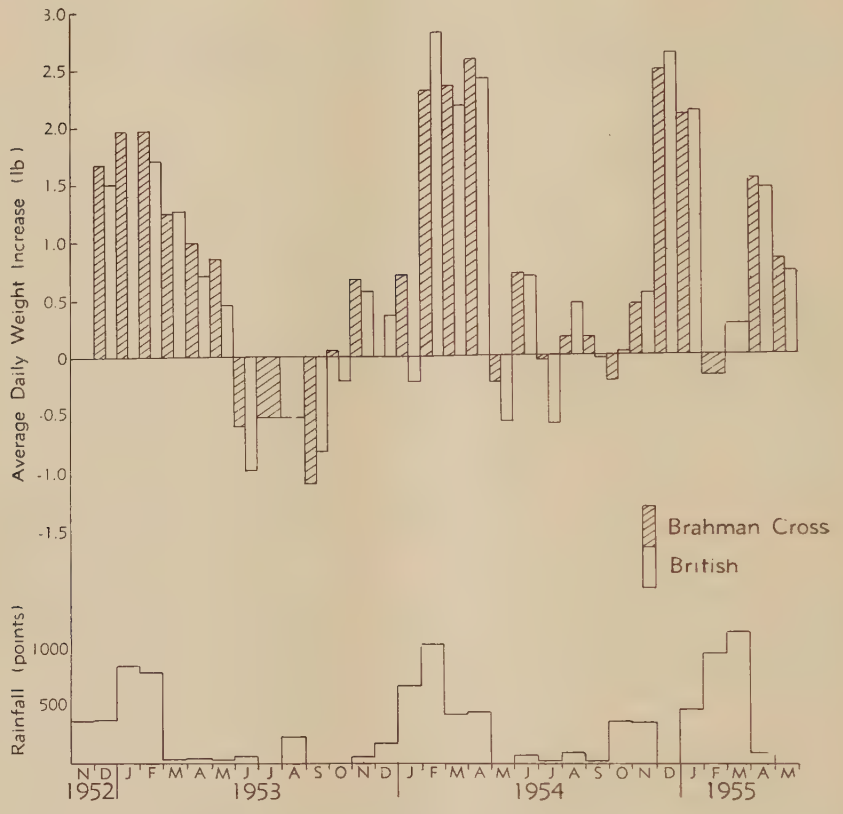


Plate 6.

**Diagram Showing Growth Rate of Cattle in Relation to Rainfall.**

Plate 6 shows the average daily increase or decrease in weight, calculated on a monthly basis. Monthly rainfall in points is also shown.

The British group gained an average of 2·80 lb. per day in February 1954 and 2·57 lb. per day in December 1954. The highest gain by the Brahman crossbreds was in April 1954, when an average increase of 2·55 lb. was recorded.

The greatest loss by either group 1·10 lb. per day) was recorded by the Brahman crossbreds in September, 1953. June 1953 was the only other month in which a loss of 1 lb. per day was recorded, the British group being concerned in this instance.

## GENERAL GROWTH PATTERN.

The pattern of growth was similar for both groups. Steady weight gains were made from November 1952 until May 1953. This was followed by a decline until September 1953. Further gains then occurred, although it was January 1954 before the previous peak weight was reached.

Gains continued until June 1954, when a slight decline took place in the British group. This small loss of weight was recovered by November of that year. The Brahman crossbreds made very slight weight gains over that period. Weather and pasture conditions were abnormally favourable during this period.

Both groups then recorded gains from November 1954 until slaughter in May 1955.

In general, the Brahman crossbreds gained more weight during the growing season and lost less weight when conditions were unfavourable.

## CARCASE WEIGHTS AND APPRAISAL.

Following the station weighing on May 9, 1955, the cattle were driven on the hoof to the railhead at Mt. Garnet and thence railed to Cairns. Droving occupied five days and the train journey one day. A spell of two days was then allowed before slaughter on May 20. Eleven days elapsed from the time of the last station weighing until slaughter. In that interval the animals did not have a chance to graze properly. This is important when considering the dressing percentage.

Through the courtesy and co-operation of the meatworks and grading authorities it was possible to obtain carcase weights by export standards.

It is necessary to remember that these 3-year-old animals were slaughtered at a considerably younger age than the normal turn-off from the district. Four to six years is regarded as the normal age at turn-off in this area.

Although it was obvious that some of the animals in the groups were not ready for marketing at the time, valuable information was obtained by so doing. There is little doubt that the vast majority of these animals had reached the age where they could have quickly produced first-grade beef if held on good pastures for a further period.

Slaughter weights and grades are as follows:—

| | British Group. | Crossbred Group. |
|---|---|---|
| Chilled carcase weight (Av. in lb.) .. | 454 | 544 |
| Dressing percentage of station liveweight | 49 | 51 |
| Percentage first grade | 6.5 | 30 |
| Percentage second grade .. .. | 76 | 63.5 |
| Percentage unsuitable for export .. | 17.5 | 6.5 |

The crossbreds showed to advantage as carcases. The dressing percentage was higher, resulting in a carcase that averaged 90 lb. heavier than the British animal.

Lack of finish was the main reason for the down-grading of carcases. The grader also commented that the crossbred carcases were generally of better shape, more mature and better finished.

## ACKNOWLEDGEMENTS.

The valuable co-operation of Messrs. K. J. Atkinson and Sons of "Wairuna," Mr. F. Pegg (manager of Queerah Meat Works, Cairns) and Mr. K. Beck (Commonwealth Meat Inspector, Cairns) is gratefully acknowledged.

## USEFUL LEAFLETS.

The following are among the advisory leaflets of use to beef cattle raisers issued by the Department of Agriculture and Stock and available free to Queensland primary producers on request:—

**No. 106. Lantana poisoning of stock.**

**No. 109. The problem of environment and breed improvement.**

**No. 116. Botulism in farm animals.**

**No. 117. Salmonellosis of livestock in Queensland.**

# The Prevention of Dairy Accidents

By J. D. ELRINGTON, Senior Adviser (Machinery), Division of Dairying.

Each year there are numerous newspaper reports of serious and even fatal accidents in dairy sheds as a result of farmers, their wives and frequently their children being caught by belts, engines and shafts.

The State Government Insurance Office reports that in the year 1953-54 there were 413 accidents in the dairying industry, and although separate figures are not kept for milking shed accidents, it is most likely that at least 2 per cent. of these accidents happen in this building, in addition to the large number of minor accidents which happen but are not reported.

Safety guards are conspicuous by their absence in almost all dairies in Queensland, but an occasional guard is to be found.

The engine room or air space is a particularly dangerous place. The engine crankshaft, slotted to take the crank handle, mounted about 2 feet from the floor and rotating at approximately 800 revolutions per minute, is liable to entangle the clothing of anyone going near it while it is rotating, thus causing the person to be thrown heavily to the floor.

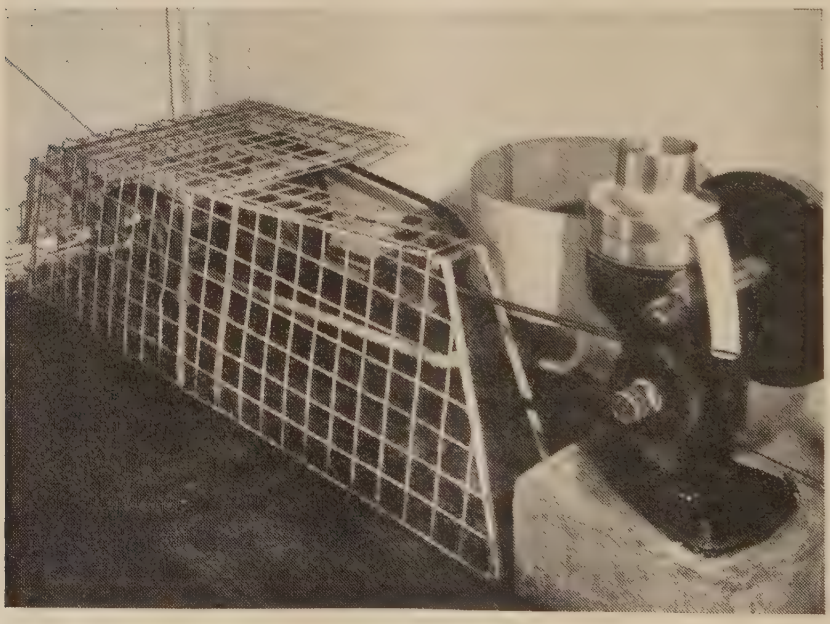

Plate 1.

**A Shaft and Belt Guard in a Separator Room.**

The air space is very restricted in area. It contains besides the engine, a vacuum pump, countershaft and belting, all capable of inflicting serious injury on the unwary. A gate should be placed across the entrance to this air space or engine room so that children cannot climb through it, and the fastener should be high enough to be out of their reach.

The countershaft extends into the separator room usually about knee-high, and rotates at approximately 300 revolutions per minute. It is a virtual death trap. Even a smooth shaft revolving at only 10 revolutions per minute has been known to entangle clothing and cause serious injury. A timber or steel mesh guard built over and around this shaft offers protection.

The belt-drive to the separator, generator, skim-milk pump and refrigerator compressor should also be protected by means of a guard.

Even a wooden box fastened to the floor with the open end over the end of the countershaft will reduce the risk until a permanent guard can be built.

There are occasional reports received of separator bowls being dislodged with explosive violence, and also of bowls bouncing off the spindle and either travelling right through the corrugated iron roof or bouncing at high speed round and round the separator room, throwing sparks from everything struck.

A separator bowl rotates at approximately 7,000 revolutions per minute (over 100 revolutions per second), and it usually is explosively dislodged because the nut holding it together is worn and the pressure causes the thread to strip. Worn spindle and faulty balance allow a bowl to break loose or bounce off the spindle. These accidents can be prevented by normal separator maintenance.

Electricity can be particularly dangerous when associated with damp conditions as found in a dairy. All electrical installations must be made by registered electricians; long leads and temporary connections should not be used.

Ensure that your dairy is safe, particularly for your wife and children, and if there are any doubts, consult your local Dairy Officer and follow his advice. He will also examine floors, water heating equipment and drains to ensure that the possibility of accident is reduced to a minimum. No parent is indifferent to the safety of his children and only a small amount needs to be expended to achieve the desired result.

## LEAFLETS FOR DAIRYMEN.

Dairy farmers will be interested in the following recent issues of the Division of Dairying of the Department of Agriculture and Stock:—

**A survey of milking times and practices.**

**Seasonal calving for dairy cows.**

**The Queensland Dairy Produce Acts: Their chief provisions affecting farmers.**

# Concrete Holding Yards.

By E. G. FITZGERALD, formerly Senior Dairy Adviser, Gympie.

**Germ-laden dust raised in the holding yard is a menace to milk and cream quality.**

**Mud churned up in the yard doubles the time required for washing udders and teats and cleaning the floors.**

**The answer to both dust and mud is the concrete holding yard.**

Everyone is familiar with the earth floored holding yard, for many years the best that could be provided owing to lack of finance.

In a dry period the yarding of cows twice daily in this confined space resulted in the dirt and manure being powdered up. This resultant dust, settling in milk and on utensils, proved to be a major source of contamination and cause of milk spoilage. In addition, much inconvenience was caused to the milking personnel.

During a wet period the same yard often became very muddy and waterlogged, and these conditions resulted in much extra labour and time to carry out necessary teat and udder washing, and also floor cleaning.

With the use of the Combined Milking Shed, which makes provision for milk or cream to be stored under the same roof as the milking shed, dust must be kept to a minimum. This task is greatly facilitated by the provision of a suitable 30 ft. stock-free enclosure and a holding yard which is situated at the opposite end of the shed to the dairy section. However, this dust menace can be further reduced if the holding yard is concreted.

Plate 1.

**Concrete Holding Yard on a Mount Cooroy Farm.**

Plate 2.

**Concreted Approach to the Holding Yard.**

In some cases farmers dislike the idea of cows entering the bails from the end, and, in these instances, a small concrete holding yard in front of the bails is permissible.

## MAJOR ADVANTAGES.

Farmers having dairy premises equipped with concrete holding yards have found them to have several advantages, the main ones of which are discussed here.

*Freedom from Dust.* As already stated, a number of cows in an earth holding yard stir up large quantities of dust in dry weather; with a concrete yard this is eliminated.

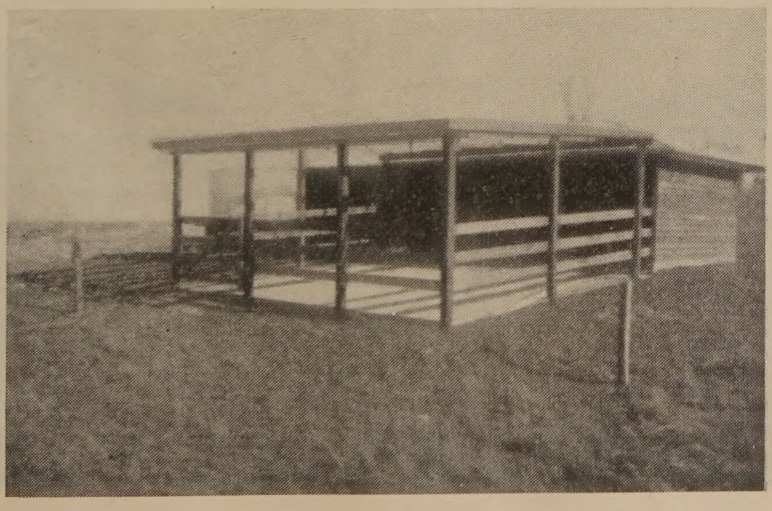

Plate 3.

**A Roofed Concreted Holding Yard at The Dawn, Gympie District.**

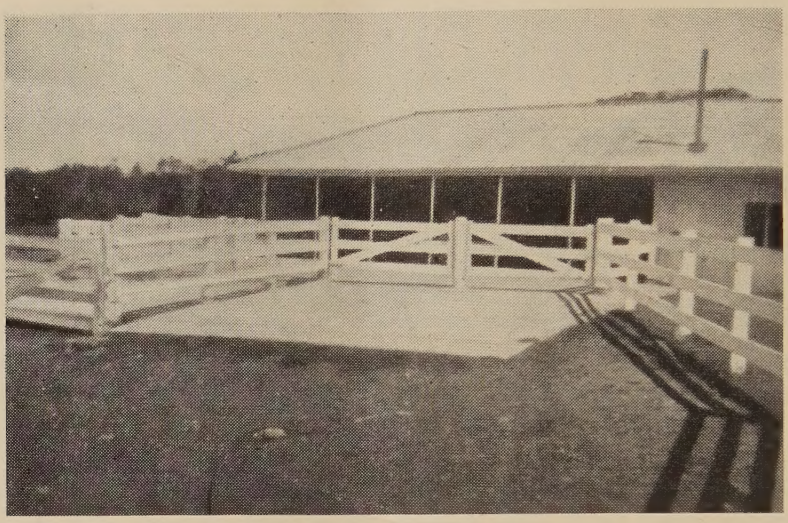

Plate 4.

**A Concreted Holding Yard and Approach in the Gympie District.**

*Ease of Cleaning.* A concrete yard facilitates the daily removal of droppings and the drainage of urine from the yard. This overcomes the unhygienic conditions often associated with the milking shed.

*Effect on Health of Cows.* A concrete yard removes a potential source of infection by such diseases as footrot and mastitis and eliminates a potential breeding ground for worms and flies.

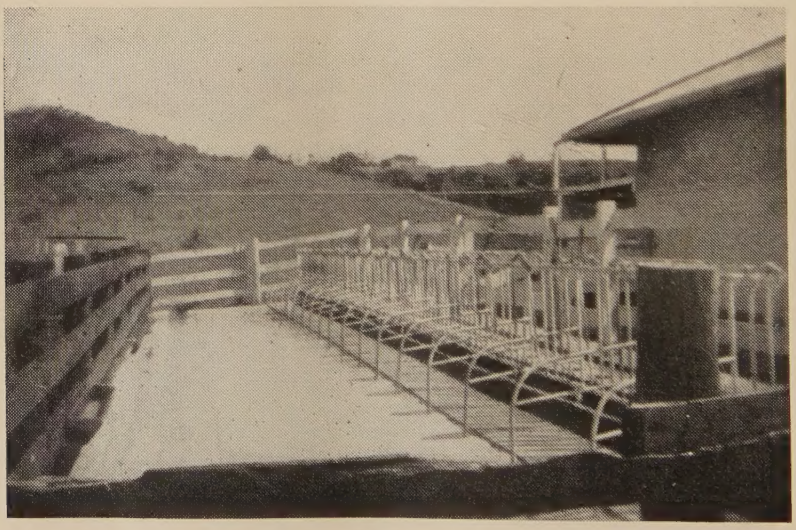

Plate 5.

**Calf Feeding Stalls in a Concreted Yard.**

*Effect on Milking Hygiene.* The amount of dust and mud fouling the teats and udders is reduced, with a consequent reduction in the contamination potential to the milk and cream.

*Effect on Personal Comfort.* The amount of cleaning required for the teats and udders is greatly reduced, thus lessening the amount of time and effort necessary in such cleaning operations. Also, there is a saving on the amount of water and chlorine necessary to such cleaning. Some farmers have erected a roof over their concrete holding yard. This has the distinct advantage of allowing the cows to dry off before entering the bails in wet weather, thus further adding to the comfort of the milker.

## SUITABLE YARDS.

Some examples of concrete holding yards are given in Plates 1-5.

Plates 1 and 2 show a Mount Cooroy milking shed equipped with a concrete holding yard and a concrete approach to the holding yard.

The dimensions of the holding yard are 21 ft. by 35 ft. and the shed 57 ft. by 16 ft. The approach is 45 ft. by 9 ft.

The concrete was put down in sections approximately 9 ft. by 6 ft. and the cost of all the concreting to these premises in 1950 was £107. All concrete is 4 in. deep.

Plate 3 shows yards at The Dawn in the Gympie District. As will be seen, provision has been made for roofing the holding yard.

The dimensions of this yard are 22 ft. by 22 ft. The amounts of labour and material for the holding yard were:—

*Labour.*—2 men for 2 days with a hand concrete mixer.

*Material.*—Rocks or large stones were used for a foundation.

8 yards of sand and gravel.

20 bags of cement.

The roof required:—

*Labour.*—2 men for 4 days.

*Material.*—8 posts 5 in. x 5 in. x 12 ft.; 7 rafters 5 in. x 2 in. x 23 ft.; 4 top plates 6 in. x 3 in. x 23 ft.; 200 lineal feet battens; 1 face board ¾ in. x 6 in. x 23 ft.; 200 lineal feet 6 in. x 1½ in. rails; 60 lineal feet 4 in. x 1 in. gate; fittings for gate £1; iron, 26 sheets 8 ft.; 13 sheets 7 ft.

Plates 4 and 5 show a suitable holding yard and the ideal conditions obtainable when a concrete yard is laid in the calf feeding stalls. These photographs were obtained from a farm in the Gympie area.

## RECOMMENDED MIX.

For those farmers who intend concreting their bails the following mixture will serve as a useful guide. The laying of a cubic yard of concrete (this is equivalent to a 4 in. floor over an area 9 ft. by 9 ft.) with a mixture of 6 of filling material to 1 of cement would require 5 bags of cement, 20 cubic feet of graded gravel and 10 cubic feet of sand. Diameter size of gravel to be used should not be greater than one-quarter of the floor thickness.

# Rendering Cooking Fats.

Cooks hate having to use rancid fats and everyone else hates having to eat food fried in rancid fat. Even more objectionable is the "pongy" fat in dripping. Apart from throwing it away, feeding it to any animal that will eat it, or using it as a grease or for making soap, what can be done about it?

Prevention is better than cure, so let us look at the causes of rancidity and fat spoiling and then attempt to get over the main difficulties. And let us confine ourselves to beef dripping, the commonest cause of complaint.

There are two home sources:—

(1) The dripping that drips or renders out from meat.

(2) The material that is especially produced from lumps of fatty tissue, like kidney knobs, caul fat and ruffle fat, or from chips and trimmings.

There isn't much that can be done about the meat dripping except to clarify it and store in a cool dark place, but there is a lot that can be done about the body fat that is rendered down for dripping.

The biggest enemies to good quality dripping are—

(1) Bits of blood and serum spattered over it.

(2) High temperature.

(3) Germs.

Blood and serum contain ferments which attack rapidly and convert some of it into acids which lower quality and favour development of off-flavours. High temperatures affect the fat by accelerating all the deterioration processes. Germs which attack fat break it down into simple substances, often with objectionable odour and taste.

What are the answers? They suggest themselves, but a quick run through the procedure of rendering dripping on a station property will reinforce them.

As soon as the fatty tissue is removed from the body, wash well in cold water. Mince or chop into small pieces. Put into the rendering vessel, add a little water and heat with constant stirring. If choicest fat is required, do not heat above 120°F. Draw off the floating melted fat into another vessel and raise the temperature quickly to 180°F. Remove heat, sprinkle fine salt over the fat to give a clear separation, and allow to stand. Later, separate the fat from the bottom residue. Drain off water if necessary, and store.

If good rather than choice dripping is needed, first take the temperature up to the stage where spitting is active, then cool, drain off fat, settle and store.

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